SONY

HD DIGITAL VIDEOCASSETTE RECORDER

HDW-F500

PARALLEL INTERFACE KIT
BKDW-509

HD LINE CONVERTER BOARD
HKDV-502

HD PULL DOWN BOARD
HKDV-507

HDCAM

ISR Interactive Status Reporting

MAINTENANCE MANUAL Part 1

1st Edition

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l’entretien. Afin de réduire les risques de décharge électrique, d’incendie ou de blessure n’effectuer que les réparations indiquées dans le mode d’emploi à moins d’être qualifié pour en effectuer d’autres. Pour toute réparation faire appel à une personne compétente uniquement.

HDW-F500	Serial No. 10001 and Higher
BKDW-509	Serial No. 10001 and Higher
HKDV-502	Serial No. 10001 and Higher
HKDV-507	Serial No. 10001 and Higher

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ.
Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

Attention-when the product is installed in Rack:

1. **Prevention against overloading of branch circuit**
   When this product is installed in a rack and is supplied power from an outlet on the rack, please make sure that the rack does not overload the supply circuit.

2. **Providing protective earth**
   When this product is installed in a rack and is supplied power from an outlet on the rack, please confirm that the outlet is provided with a suitable protective earth connection.

3. **Internal air ambient temperature of the rack**
   When this product is installed in a rack, please make sure that the internal air ambient temperature of the rack is within the specified limit of this product.

4. **Prevention against achieving hazardous condition due to uneven mechanical loading**
   When this product is installed in a rack, please make sure that the rack does not achieve hazardous condition due to uneven mechanical loading.

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Manual Structure

Purpose of this manual

This manual is the maintenance manual part 1 of the HD digital video cassette recorder HDW-F500.
This manual is intended for use by trained system and service engineers, and is provided information required for the installation, maintenance information and information for service such as replacement of plug-in boards.
And this manual is provided the related information (such as installation.) for the following optional boards.

BKDW-509	Paralle Interace Kit
HKDV-502	HD Line Converter Board
HKDV-507	HD Pull Down Board

Related manuals

Besides this maintenance manual part 1, the following manuals are available.
The part numbers for the manuals are as of October 1999.

- **Operation Manual (Supplied with this unit)**
  This manual is necessary for the use and operation (and installation) of this unit.
  Part No.: 3-203-128-01

- **Maintenance Manual Part 2 (Available on your request)**
  This manual is provided information that is premised the parts level service (adjustments, board layouts, schematic diagrams, detailed parts list and the like.) for this unit and optional board. If this manual is required, please contact to your local Sony's sale/service office.
  Volume 1 (Service Information , Replacement of Parts and Adjustments)
  Part No.: 9-968-552-01
  Volume 2 (Schematic Diagrams, Board Layouts, Block Diagrams, Exploded View and Parts Lists).
  Part No.: 9-968-553-01

- **Protocol Manual for Remote (9-pin) (Available on your request)**
  This manual is explained the protocols for controlling this unit by the RS-422A (9-pin serial remote). If this manual is required, please contact to your local Sony's sale/service office.
  Part No.: 9-968-513-61

- **BKDW-509 Interface Manual (Available on request)**
  This manual is explained the protocols for controlling this unit by the parallel 50-pin. If this manual is required, please contact to your local Sony's sale/service office.
  Part No.: 9-967-559-04

- **ISR Protocol Manual (Available on your request)**
  This manual is explained the ISR functions (Interactive Status Reporting/Integrated Equipment Management Function) of the this unit. If this manual is required, please contact to your local Sony's sale/service office.
  ISR: Interactive Status Reporting/Integrated Equipment Management Function
  Part No.: 9-968-521-61

Contents

The maintenance manual part 1 is organized by following sections.

Section 1 Installation
This section is described about the information that is required to install (operating conditions, installation space, connection information, initial setting and the like.) and when installing this unit and optional board to this unit.

Section 2 Service Overview
This section is described about fundamental information that is required for service (removing of cabinet and cassette compartment, location of printed circuit board and main parts, fixture and measuring equipments cautions and the like.), measures against trouble and ISR (Interactive Status Reporting).

Section 3 Self Diagnosis
This section is described about error messages and error logger.

Section 4 Maintenance Mode
This section is described about each menu of the maintenance mode.

Section 5 Periodic Maintenance and Inspection
This section is described about the recommended periodic maintenance and cleaning procedures.

Section 6 Spare Parts
This section is described about the repair parts list for the service parts of this unit, packing materials and supplied accessories list, and optional parts list.

Section 7 Overall Block Diagram
This section is described about overall block diagram.

Section 1
Installation

1-1. Operating Conditions

Note

To prevent internal heat build-up, do not block the ventilation holes on the cabinet and the air vents of the fan.

Operating temperature:

+5 ˚C to +40 ˚C

Operating humidity:

25% to 80% (Condensation no allowed)

Storage temperature:

−20 ˚C to +60 ˚C

Locations to avoid:

- Areas where the unit will be exposed to direct sunlight or any other strong lights.
- Areas near heat sources.
- Dusty areas or areas subject to vibration.
- Areas with strong magnetic field.
- Areas with considerable electric noise.
- Areas where static electricity occur easily.
- Areas without the required installation space. (Refer to “1-6-1. Installation Space”.)

Horizontal condition:

Do not tilt the front and rear of the unit by more than 30°.

CAUTION

When using the unit where it is not horizontal, fix the unit properly so that it does not slip.

1-2. Power Supply

1-2-1. Power Supply Specifications

WARNING

Be sure to operate the unit within the range of the following recommended power supply voltage.

Recommended power supply voltage:

AC 100 to 240 V ± 10%

Recommended power frequency:

50 Hz or 60 Hz

Power consumption:

230 W

Rush current:

Power supply voltage 100 V: 10 A

Power supply voltage 240 V: 20 A

This unit uses a switching regulator.

Note

The AC power supply requires a capacity commensurate with the rush current.

If the AC power supply capacity is insufficient, the breaker of the AC power supply at the supply side may operate or this unit may not operate normally.

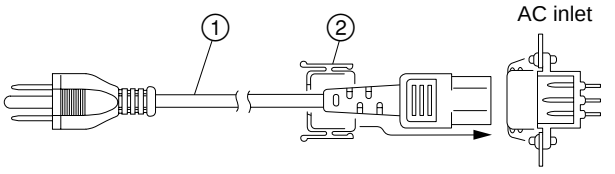
1-2-2. Power Cord

WARNING

Use only the specified power cord when connecting the AC power supply.
Never use a scratched power cord.

Supplied with HDW-500

① Power Cord, 125 V 10 A (2.4 m): 1-551-812-11
② Plug Holder B (Black) : 2-990-242-01



1-3. Connecting Connectors and Cables

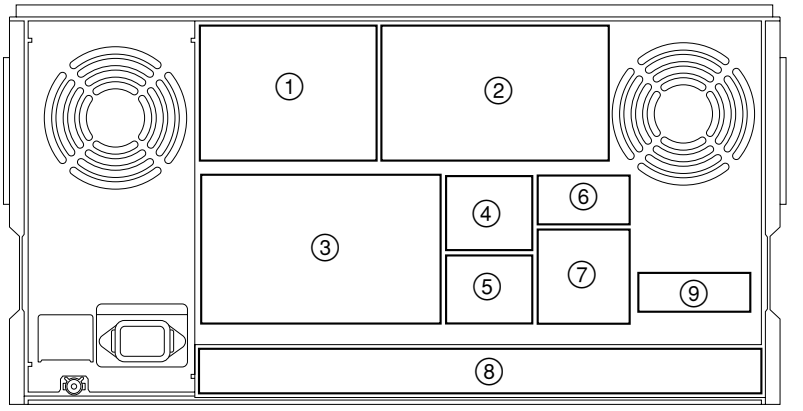
When connecting cables to connectors of this unit, use the following connectors or cables (or equivalents).

HDW-F500 Side Connector/Panel Indication	Matching Connector/Cable	Sony Part No.
ANALOG I/O REF. IN REF. OUT	BNC 75 Ω, Male	–
D CONV. OUT (When HKDV-501A is installed)	BNC 75 Ω, Male	–
DIGITAL I/O AUDIO INPUT (AES/EBU) AUDIO OUTPUT (AES/EBU)	BNC 75 Ω, Male	–
DIGITAL I/O HD SDI INPUT HD SDI OUTPUT PULL DOWN OUT (When HKDV-507 is installed)	BNC 75 Ω, Male	–
DIGITAL I/O D CONV. SDI (D1/D2) OUTPUT (When HKDV-501A is installed)	BNC 75 Ω, Male (*2)	–
ANALOG I/O AUDIO INPUT TIME CODE IN	XLR 3-pin, Male	1-508-084-00
ANALOG I/O AUDIO OUTPUT TIME CODE OUT AUDIO MONITOR R AUDIO MONITOR L	XLR 3-pin, Female	1-508-083-00
REMOTE1-IN (9P) REMOTE1-OUT (9P)	9-pin remote control cable (*4)	1-751-019-81
VIDEO CONTROL	D-sub 9-pin, Male Junction shell 9-pin	1-563-815-21 1-561-749-00
CONTROL PANEL	D-sub 15-pin, Male Junction shell 15-pin	1-561-610-21 1-561-929-00
RS232C	D-sub 25-pin, Male	1-566-356-11
PARALLEL I/O (50P)	D-sub 50-pin, Male	1-556-358-11
PHONE (*3)	JM-60 stereo phone plug	–

(*1): Max. cable length: 100 m
However it is recommended that the 5C-FB Fujikura Densen coaxial cable or equivalent be used.
(*2): Max. cable length: 200 m
However it is recommended that the 5C-2V Fujikura Densen coaxial cable or equivalent be used.
(*3): On the front (upper control panel).
(*4): Supplied with the HDW-500.

1-4. Signal Inputs and Outputs of Connector

<Reduced Drawing of Rear Panel>



Communication connectors

⑧ CONTROL PANEL	D-SUB 15P connector
⑧ REMOTE 1 IN	D-SUB 9P connector
⑧ REMOTE 1 OUT	D-SUB 9P connector
⑧ RS232C	D-SUB 25P connector
⑧ VIDEO CONTROL (When installing optional HKDV-503 digital video controller)	D-SUB 9P connector
⑨ REMOTE PARALLEL I/O (When installing optional board BKDW-509)	D-SUB 50P connector

Input connectors

① REF HD	BNC × 2 (loop through connection) Ternary SYNC 0.6 Vp-p, 75 Ω
① REF SD	BNC × 2 (loop through connection) Black burst 0.286 Vp-p, 75 Ω, sync negative
② DIGITAL AUDIO (AES/EBU) CH1/2, CH3/4	BNC × 2 AES/EBU format stereo mode, unbalanced
② DIGITAL HD SDI	BNC × 1 (1; With Input monitor output) HD serial digital (1.485 Gbps) BTA S-004A
② SDTI (OPTION)	BNC × 1
③ ANALOG AUDIO CH1/2/3/4/CUE	XLR3 pin × 5 LOW OFF: −60 dBu, high impedance, balanced HIGH OFF: +4 dBu, high impedance, balanced HIGH ON: +4 dBm, terminated at 600 Ω, balanced
④ TIME CODE IN	XLR3 pin × 1 0.5 to 18 Vp-p, 10 kΩ, balanced

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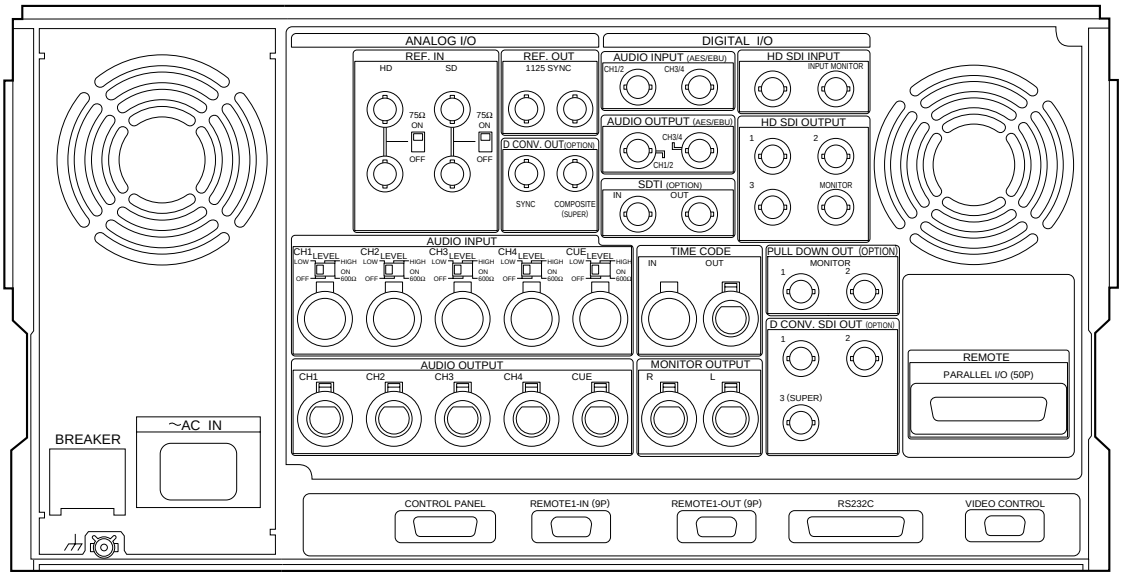
< Rear Panel >

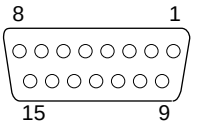


Output connectors

① REF 1125 SYNC	BNC × 2 0.6 Vp-p, 75 Ω
① D CONV. SYNC (When installing the optional board HKDV-501A)	BNC × 1 0.286 Vp-p, 75 Ω, sync negative
① D CONV. COMPOSITE (SUPER) (When installing the optional board HKDV-501A)	BNC × 1 1.0 Vp-p, 75 Ω, sync negative
② DIGITAL AUDIO (AES/EBU) CH1/2, CH3/4	BNC × 2 AES/EBU format stereo mode, unbalanced
② SDTI (OPTION)	BNC × 1
② DIGITAL HD SDI 1/2/3/MONITOR	BNC × 1 (including 1 for character superimpose) Serial digital (1.485 Gbps) BTA S-004A
③ ANALOG AUDIO CH1/2/3/4/CUE	XLR3 pin × 5 +4 dBm (600 Ω load), balanced
④ TIME CODE OUT	XLR3 pin × 1 2.2 Vp-p, low impedance, balanced
⑤ AUDIO MONITOR R/L	XLR3 pin × 2 +4 dBm (600 Ω load), balanced
⑥ PULL DOWN OUT (OPTION) MONITOR 1/2 (When installing the optional board HKDV-507)	BNC × 2 (including charactor superimpose) Serial digital (1.485 Gbps) BTAS-004A
⑦ D CONV. SDI (OPTION) 1/2/3 (SUPER) (When installing the optional board HKDV-501A)	BNC × 3 (including 1 for character superimpose) Serial digital (270 Mbps or 143 Mbps) SMPTE259M/CCIR656-3
HEADPHONES (Upper control panel)	JM-60 stereo phone jack Up to –12 dBu (8 Ω load), unbalanced

CONTROL PANEL: 15-pin (Female)

<External View>

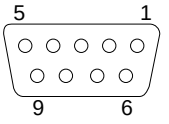


CONTROL PANEL

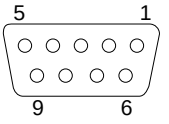
Pin No.	Signal Name
1	KEY RX (–)
2	KEY RX (+)
3	NC
4	REG +8 V
5	REG +8 V
6	REG +8 V
7	REG +8 V (2)
8	NC
9	GND
10	KEY TX (+)
11	NC
12	KEY TX (+)
13	GND
14	GND
15	GND

REMOTE-1 IN/OUT: 9-pin (Female)

<External View>



REMOTE 1-IN



REMOTE 1-OUT

REMOTE 1-IN

Pin No.	Signal Name
1	GND
2	RM TX (–)
3	RM RX (+)
4	GND
5	PRIORITY IN
6	GND
7	RM TX (+)
8	RM RX (–)
9	GND

REMOTE 1-OUT

Pin No.	Signal Name
1	GND
2	RM TX (–)
3	RM RX (+)
4	GND
5	PRIORITY OUT
6	GND
7	RM TX (+)
8	RM RX (–)
9	GND

Note

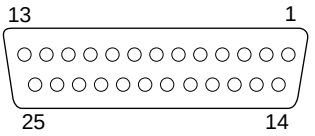
Pin No. 5

PRIORITY IN: Each unit confirms that there is the next unit sequentially.

PRIORITY OUT: The last unit which confirmed that there is no next unit notifies the HDW-500 that all units have been connected.

RS232C: 25-pin (Female)

<External View>

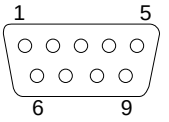


RS232C

Pin No.	Signal Name
1	FG; Frame Ground
2	TXD; Transmitted Data (Output)
3	RXD; Received Data (Input)
4	RTS; Request to Send (Output)
5	CTS; Clear to Send (Input)
6	DSR; Data Set Ready (Input)
7	SG; Signal Ground
8	DCD; Data Carrier Detect (Input)
9	NC
10	NC
11	NC
12	NC
13	NC
14	NC
15	NC
16	NC
17	NC
18	NC
19	NC
20	DTR; Data Terminal Ready (Output)
21	NC
22	NC
23	NC
24	NC
25	NC

VIDEO CONTROL: 9-pin (Male)

<External View>

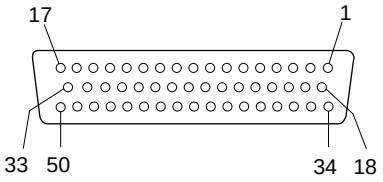


VIDEO CONTROL

Pin No.	Signal Name
1	GND
2	REM TX (–)
3	REM RX (+)
4	GND
5	N.C.
6	GND
7	REM TX (+)
8	REM RX (–)
9	GND

REMOTE PARALLEL I/O: 50-pin (Female) Factory Setting

<External View>



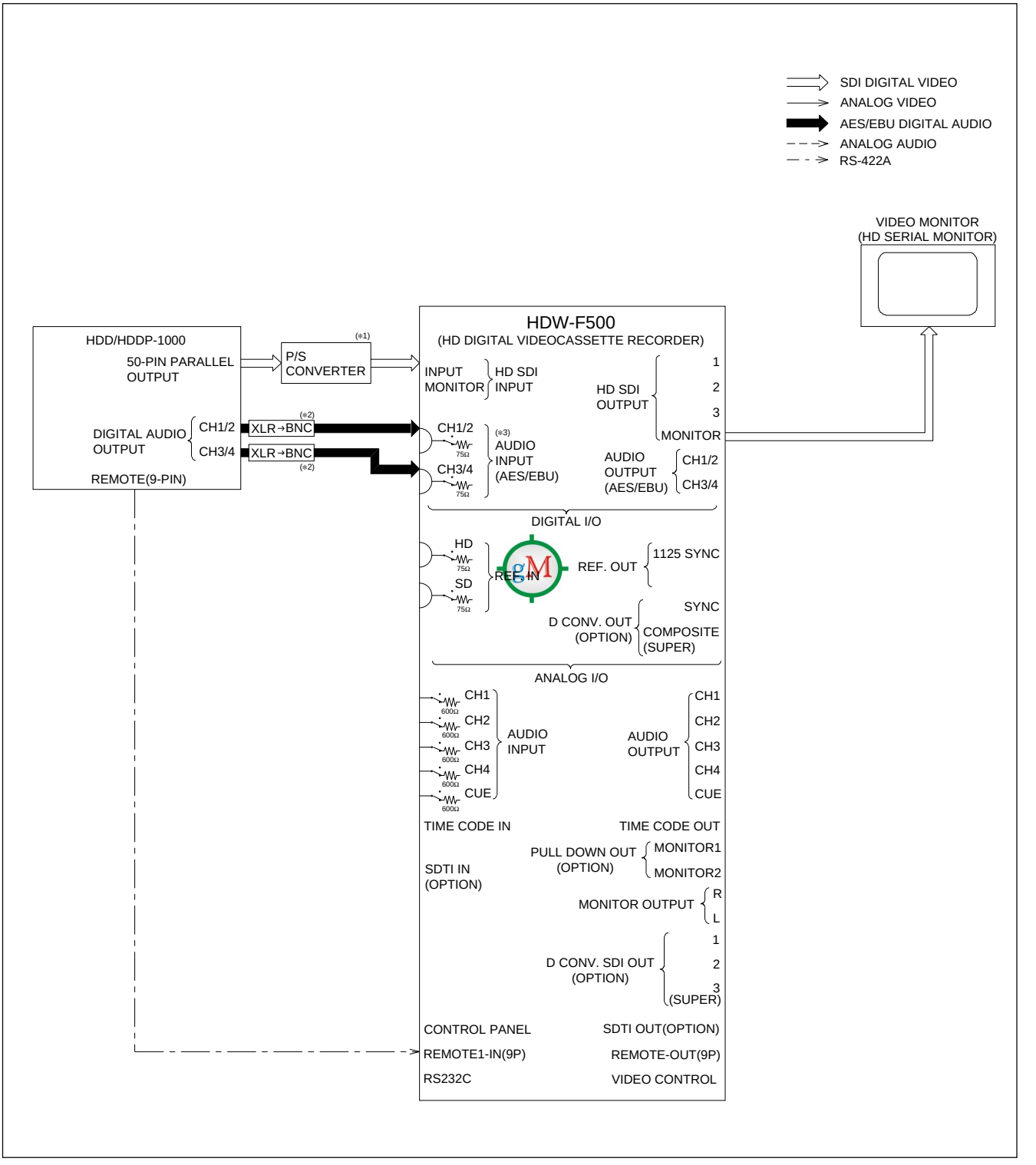
REMOTE PARALLEL I/O

Pin No.	Signal Name
1	FF IN
2	REC SW OUT
3	PLAY SW OUT
4	STOP SW OUT
5	ENTRY SW OUT
6	REF SYSTEM ALARM OUT
7	CF LOCK OUT
8	DRUM LOCK OUT
9	CAP LOCK OUT
10	CUE PRESET OUT
11	TC PRESET OUT
12	CASSETTE OUT/IN OUT
13	TAPE THICKNESS OUT
14	SPARE
15	SPARE
16	+12 V
17	GND
18	PREROLL IN
19	STBY ON IN
20	REW IN
21	ENTRY IN
22	STBY OFF IN
23	EJECT IN
24	REC OUT
25	CH CONDITION RED OUT

Pin No.	Signal Name
26	ASSEMBLE PRESET OUT
27	EDIT OUT
28	EJECT OUT
29	59.94 Hz/60 Hz OUT
30	REEL HUB
31	CURRENT DB CHANG OUT
32	ALL REC INHIBIT
33	GND
34	PLAY IN
35	STOP IN
36	REC IN
37	REV LAMP OUT
38	DA2 PRESET OUT
39	DA1 PRESET OUT
40	FWD LAMP OUT
41	DA4 PRESET OUT
42	DA3 PRESET OUT
43	STOP OUT
44	VIDEO PRESET OUT
45	INSERT PRESET OUT
46	STBY ON OUT
47	PLAY OUT
48	REMOTE OUT
49	ALARM OUT
50	PREROLL OUT

1-5. System Connection Example

1-5-1. Connection with HD Digital Equipment (When using with 59.94i and 60i modes)

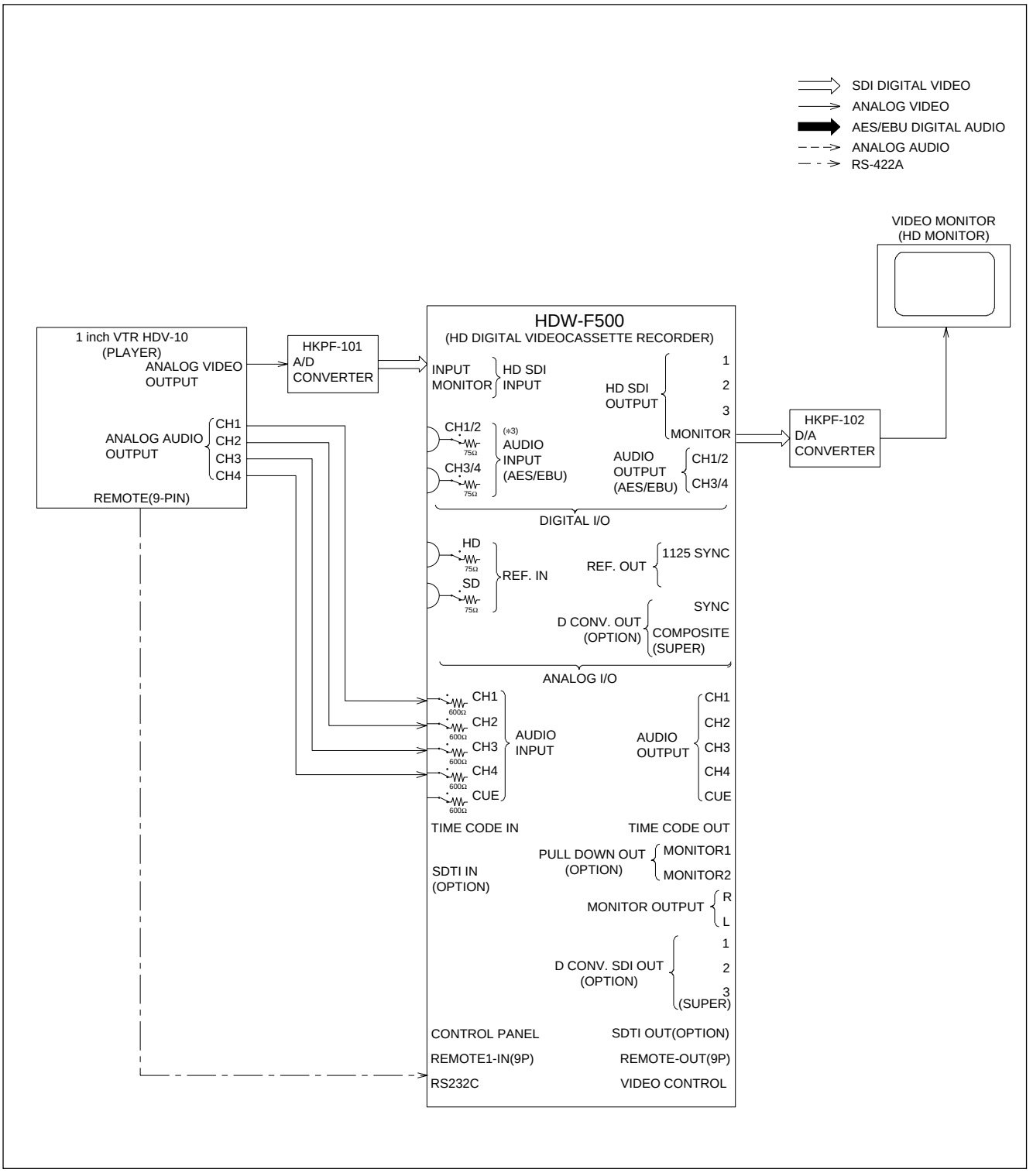


(∗1): Astro Design HD-694, etc.

(∗2): Canare BCJ-XP-TRA, etc.

(∗3): When bridge-connecting the DIGITAL AUDIO signals, set the 75 Ω termination switch to OFF.
When not bridge-connecting, set it to ON.

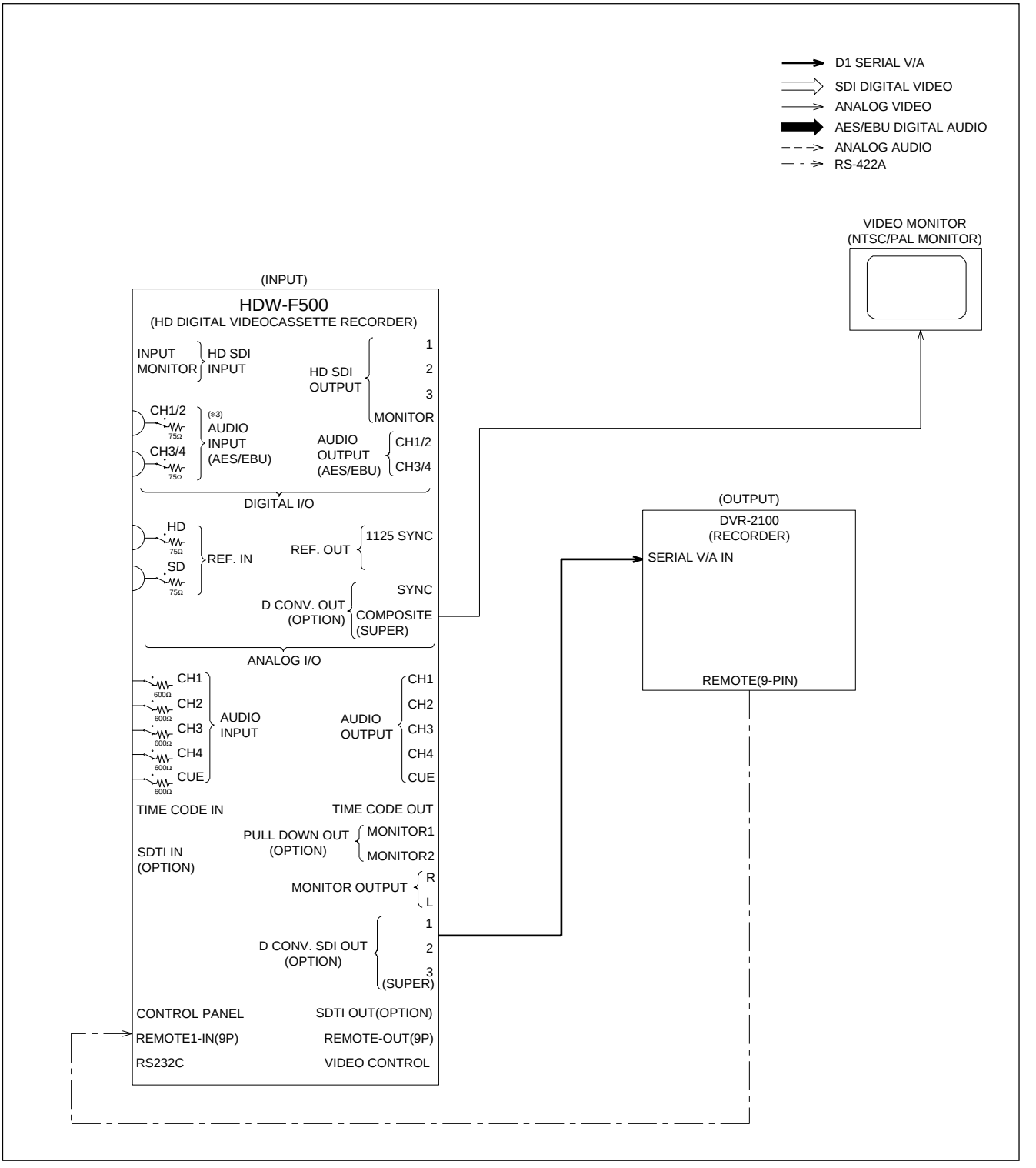
1-5-2. Connection with HD Analog Equipment (When using with 60i mode)



(*1): Switch the analog audio input level and impedance as follows using the AUDIO INPUT LEVEL/600 Ω termination switch.

600 Ω termination line audio input: ON at HIGH
High impedance line audio input: OFF at HIGH
High impedance microphone input: OFF at LOW

1-5-3. Connection with NTSC/PAL Digital Equipment



1-6. Installation of HDW-F500

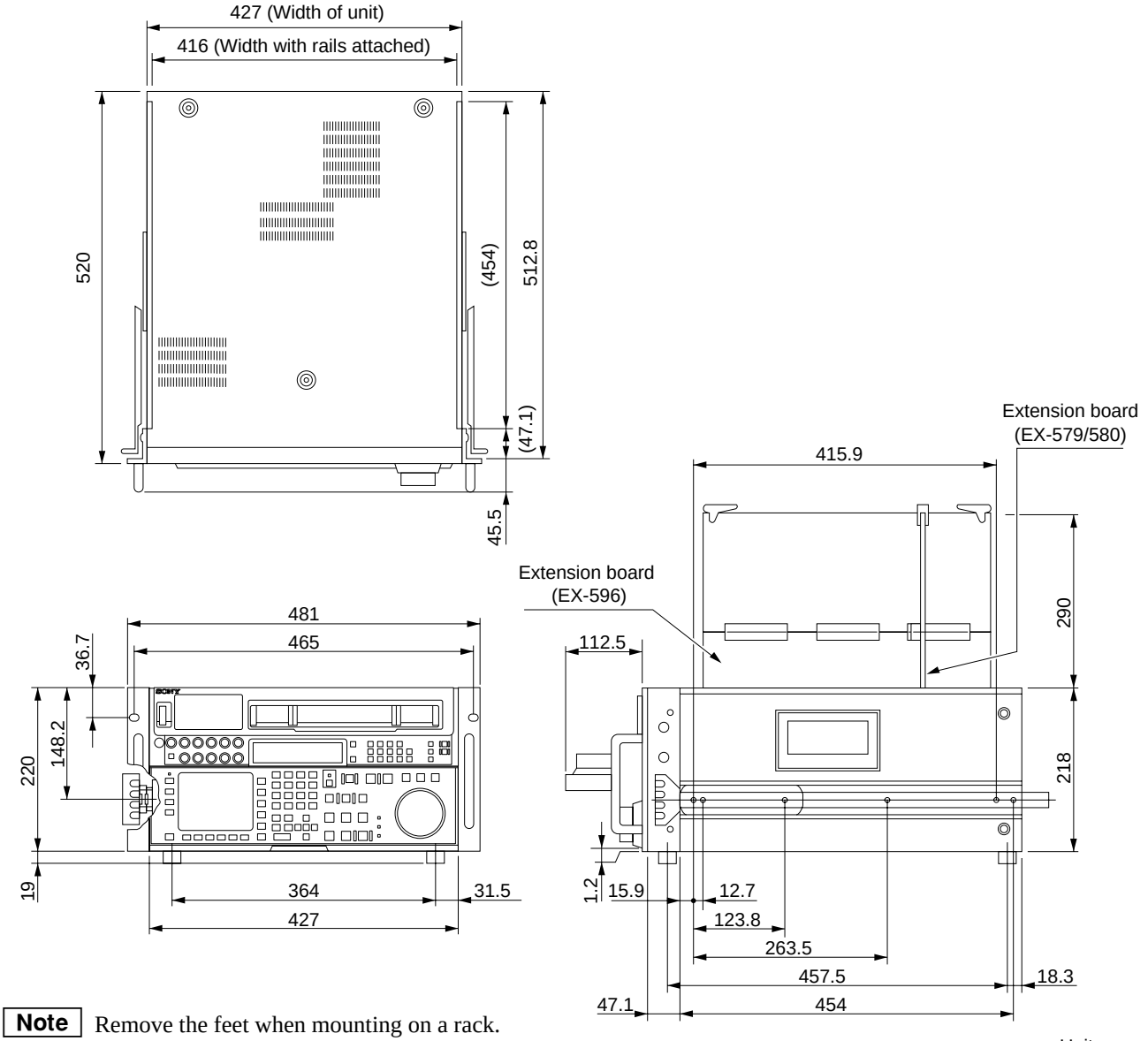
1-6-1. Installation Space

This unit is air-cooled by three fans. When installing the unit, do not block the vents of the fan and ventilation ducts (upper lid, lower portion of the front panel and bottom plate).
Leave sufficient space for servicing the unit, etc. In particular, leave more than 40 cm of space behind the unit for ventilation.
When installing and using the unit on flat surfaces such as table, etc., leave a space of more than 4 cm at the top and right side of the unit.
However, it is recommended that a space of more than 40 cm be left at the top of the unit for ease of servicing, etc.

Note

Performing operations with the upper lid removed will reduce the air-cooling effects of the fan. When performing operations with the upper lid removed during inspections, etc., it is recommended that the work be completed as quickly as possible. If operations must be carried out for a long time with the power turned on, reduce increase in temperature by blowing wind using an electric fan, etc.

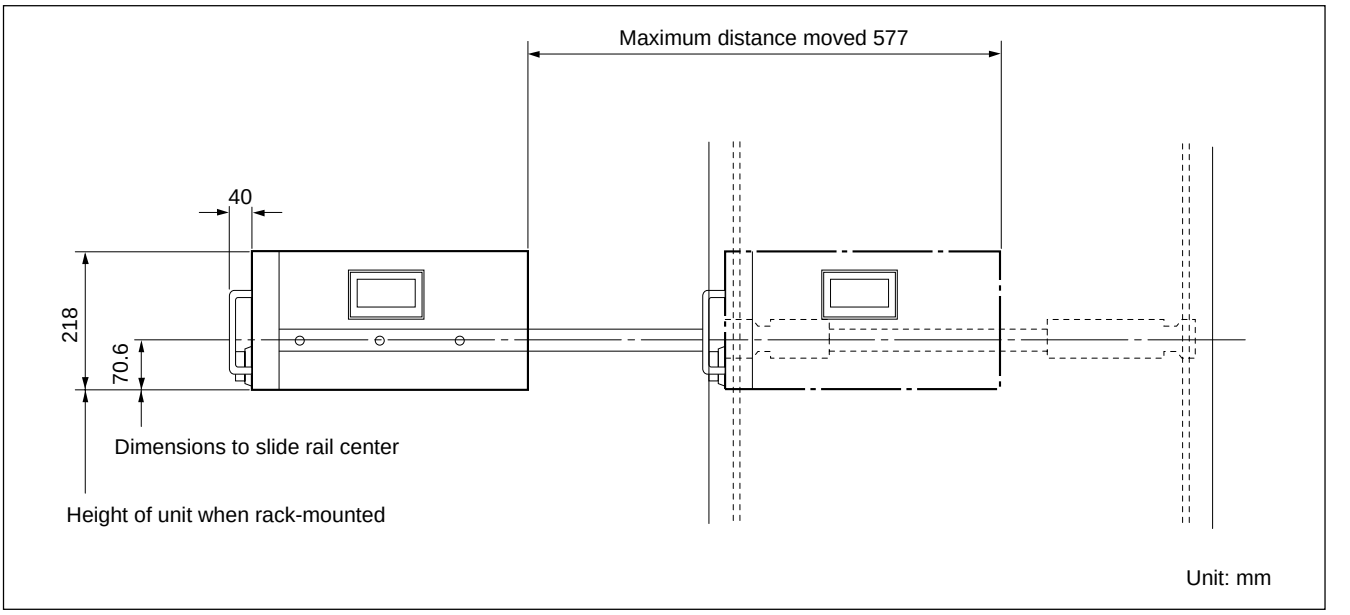
Mass: HDW-F500: 35 kg



Note Remove the feet when mounting on a rack.

Unit: mm

The following shows the maximum distance the unit can be moved when the HDW-F500 is rack-mounted.



1-6-2. Rack Mounting

This section explains the method of mounting this unit to a 19-inch standard rack.
When installing, use the designated rack mount rail, and install correctly according to the following procedure.
If not installed correctly, unexpected accidents such as dropping of equipment, turning over of rack, etc. may occur.

CAUTION

- Use the specified rack mount rail.
  Use of other rack mount rails may cause the unit to drop due to insufficient strength of the rails.
- To prevent the rack from turning over, fix the rack on a horizontal and firm ground securely using bolts.

Notes

- If another equipment with a built-in hard disk drive is already installed in the rack, turn off the power of that unit before mounting this unit to the rack.
- When mounting this unit to the rack, do not attempt to remove the upper lid and bottom plate, etc.
- Taking into account of when the unit needs to be pulled out from the rack, use a cable with sufficient length for connecting to the connector panel.
- Ensure that the internal temperature of the rack is within the operating temperature range of the unit.

Specified Rack Mount Kit

Rack mount kit : RMM-110 (Optional)
or
RACK-MOUNT SLIDES: Model 305
Slide length 558.8 mm
(22 inches)
(ACCURIDE)

Parts Packed in RMM-110

- Slide rails 2
- Rack angles (handle) 2
- Rail brackets 4
- Plate nuts (large) 4
- Plate nuts (small) 4
- Screws PSW 4 × 16 4
- Screws B4 × 8 8
- Hexagonal socket head cap screws 8
- Flat washers 8
- Screws RK5 × 14 2
- Ornamental washers 2
- L-shaped hexagonal wrench 1

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Rack Mounting Procedure

(Removal of feet)

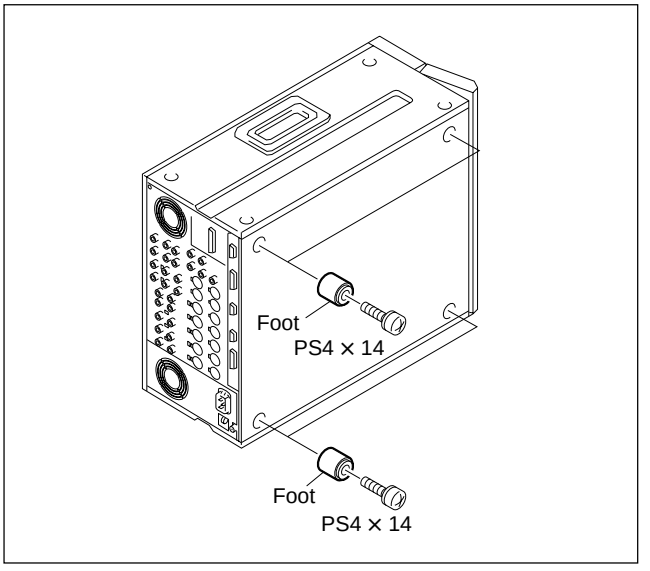
(1) Place the right side panel of the unit facing down.

Note

As the lower handle will hang down, hold it with your hand so that it does not hang down.

(2) Remove the four screws, and remove the feet from the bottom of the unit.

(3) Place the unit horizontally again.



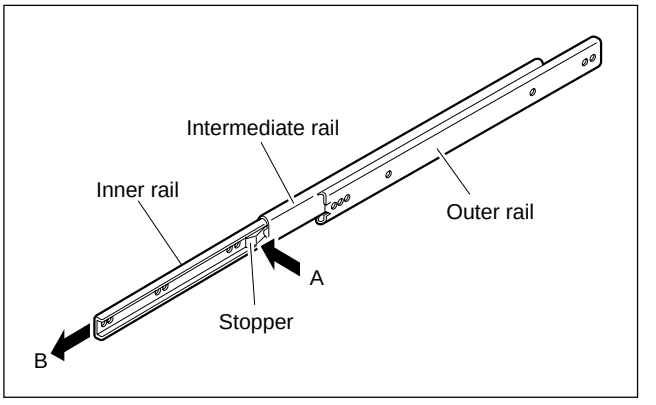
Note

Keep the screws removed and feet removed properly.
If removing the unit from the rack and using, be sure to attach the feet.
Tightening torque: 9.8 N • cm {10 kgf • cm}

<Attachment of inner rails>

(4) Pull out the inner rails from the two intermediate rails.

(5) While pressing the stopper of the inner rail in the direction of arrow A shown in the figure, pull out the inner rail in the direction of arrow B.

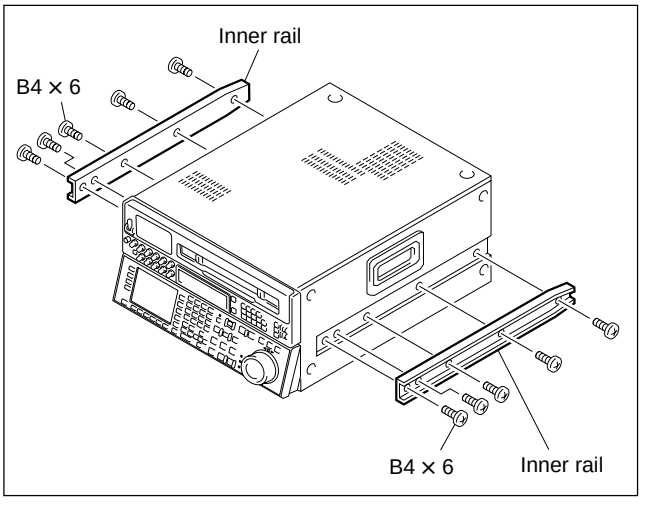


(6) Remove the ten screws shown in the figure from both the left and right sides of the unit.

(7) Attach the two inner rails to both the left and right sides of the unit using the screws removed in the procedure (6).
Tightening torque: 1.2 N • m {12.2 kgf • cm}

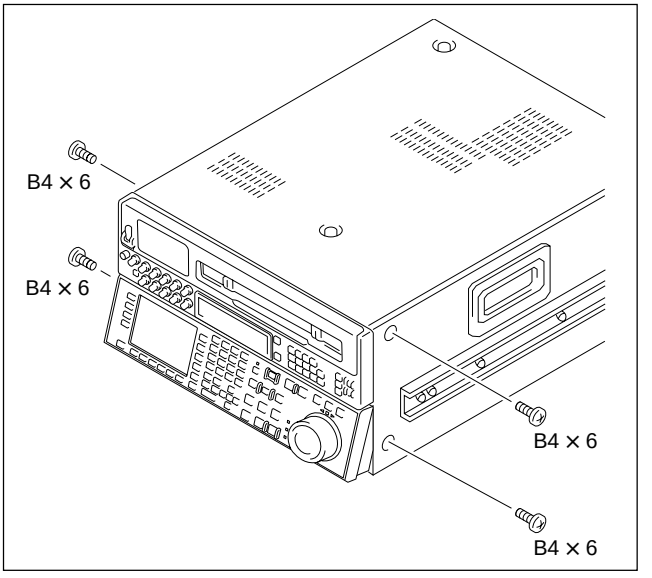
Note

Be sure to attach the inner rail using the B4 × 6 screws.
Using other screws may cause problems in the operations of the unit.

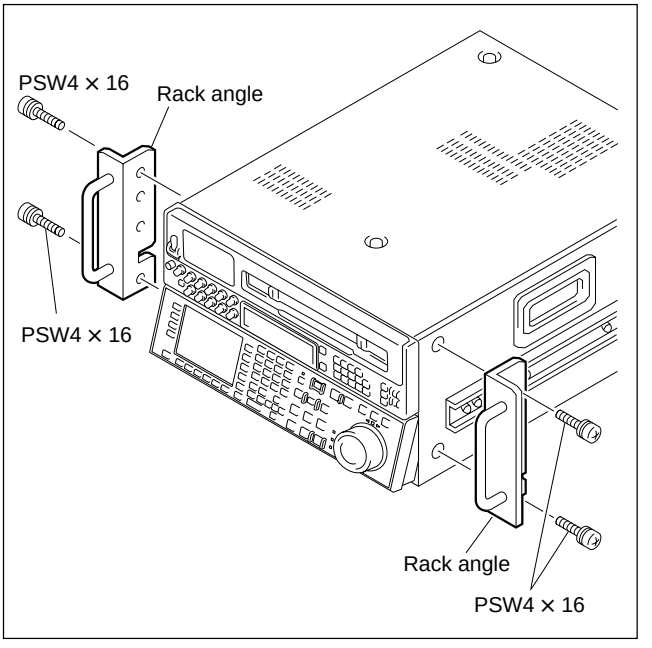


<Attachment of rack angles (handles)>

(8) Remove the four screws (B4 × 6) shown in the figure from both the left and right sides of the unit.



(9) Attach the two rack angles to the unit using the four screws (PSW4 × 16) provided with the rack mount kit. Tightening torque: 1.2 N • m {12.2 kgf • cm}.

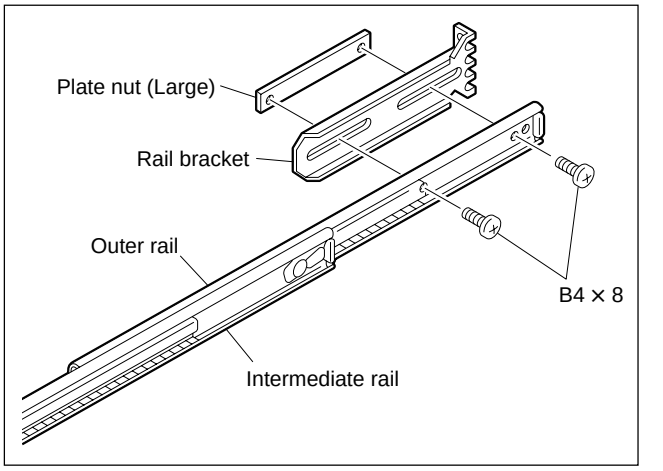


Note

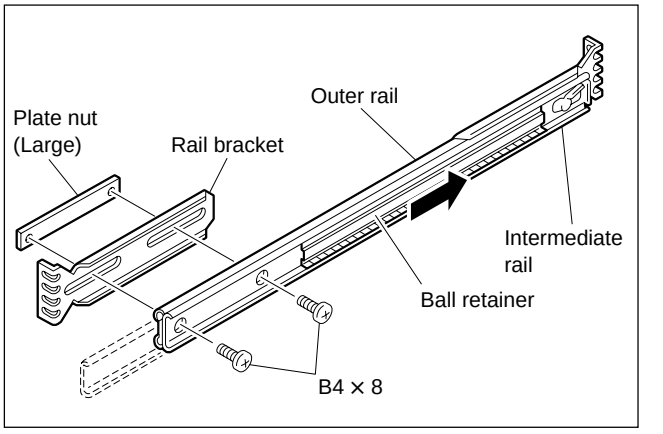
Keep the screws (B4 × 6) removed properly.
Be sure to use these screws when removing the rack angles and directly attaching the side panel using these screws. Using the screws for attaching the rack angles (PSW 4 × 16) accidentally will cause problems in the operations of the unit because they are longer than the (B4 × 6) screws.

<Temporary attachment of rail brackets>

(10) Slide the outer rail and intermediate rail as shown in the figure, and attach the rail bracket to the outer rail temporarily using the plate nuts (large) and the two screws.



(11) Slide the ball retainer to the end as shown in the figure, and attach the rail bracket to the outer rail temporarily using the plate nuts (large) and two screws.

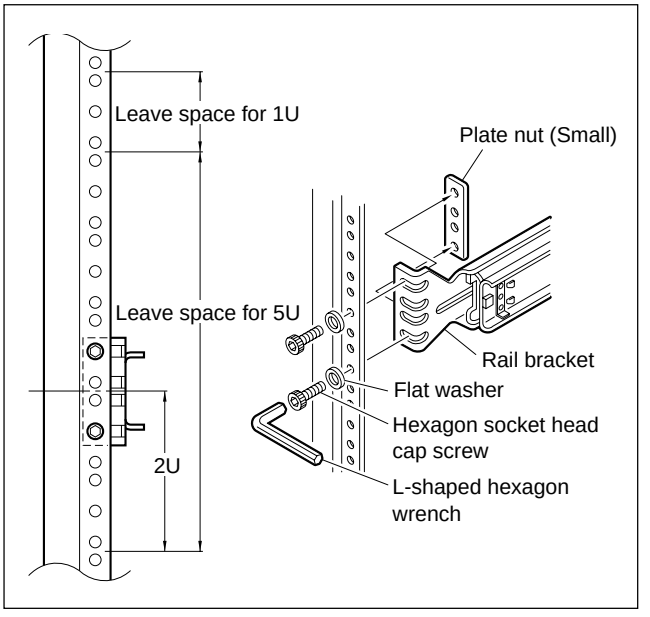


<Attachment of outer rails>

(12)As shown in the figure, attach the outer rails at the 2U position from the bottom of the 5U space for installing this unit using the eight hexagonal socket head cap screws and eight flat washers (front and rear, and right and left positions).

Note

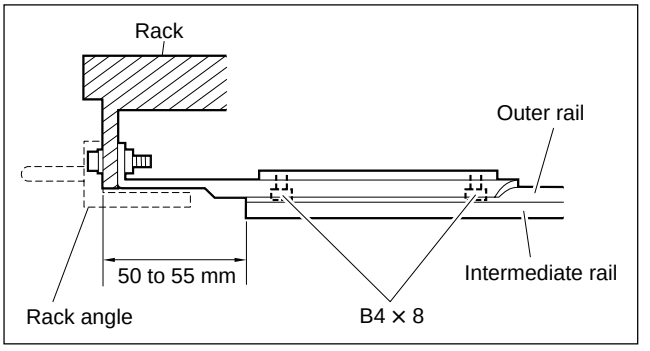
Leave about 1U space at the top of this unit to reduce increase in the internal temperature of the unit.



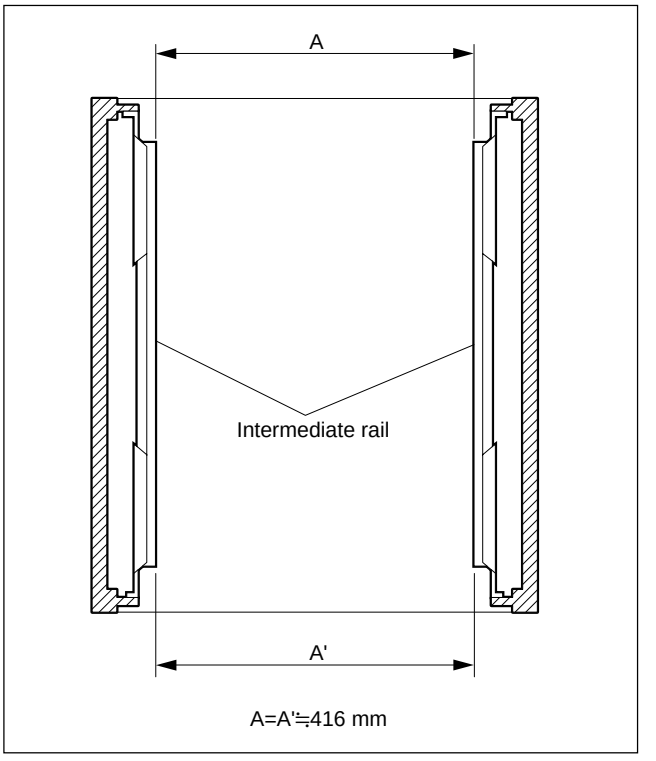
(13)Adjust the position of the rails on both the left and right sides so that the distance from the surface of the rack to the tip of the rail becomes 50 to 55 mm.

(14)Tighten the screws (four positions, total eight) attaching the rail bracket temporarily using the following tightening torque.

Tightening torque: 1.2 N • m {12.2 kgf • cm}



(15)Be sure that distance between the intermediate rails on both the left and right sides satisfy the specifications.



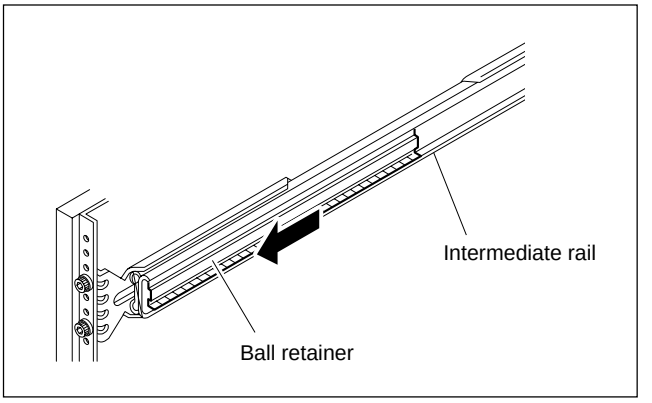
(16)Tighten the hexagon socket head cap screws (four positions, total eight) attaching the outer rails to the rack temporarily using the L-shaped hexagon wrench.

<Mounting on the rack>

CAUTION

This mounting work must be carried out by more than 2 persons.

(17)Slide the ball retainers of the intermediate rails on both the left and right sides towards you.



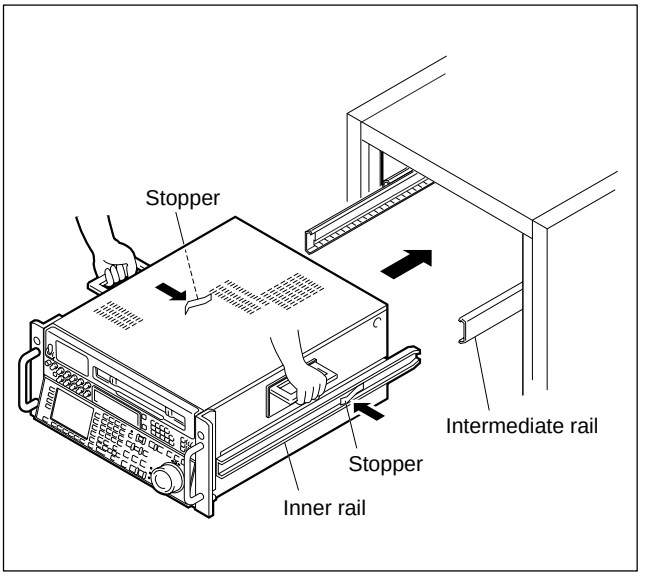
(18)Pull the left and right intermediate rails out for the equal length.

(19)Lift up the unit holding the handles, and insert the inner rails into the intermediate rails slowly.

(20)While pressing the left and right stoppers, push the unit into the rack slowly.

Note

Be careful not to catch you finger or hand in the rack mount rail.



(21)Insert and pull out the unit from the rack three times, and check that the slide rail moves smoothly.
If the slide rail does not move smoothly, remove the unit, and repeat from “Attachment of outer rails” (procedure 12).

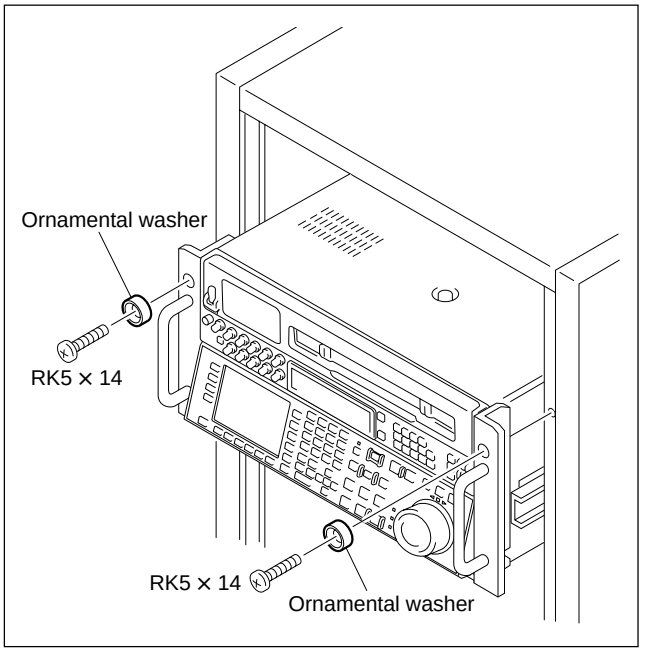
CAUTION

This removal work must be performed by more than two persons.

Note

As the unit will not have feet attached at this point, when removing the unit from the rack, handle it carefully and do not subject it to shock.

(22)Secure the unit to the rack using the two screws and two ornamental washers.
Tightening torque: 1.2 N・m {12.2 kgf・cm}



1-7. Installation of Optional Boards

1-7-1. HKDV-502

This board allows you the following functions.
- To convert an effective scanning line number from 1035 to 1080 or from 1080 to 1035.
- To automatically switches between processing for movie and still portions of a picture, thus improving the vertical resolution during slow-motion playback.

Components

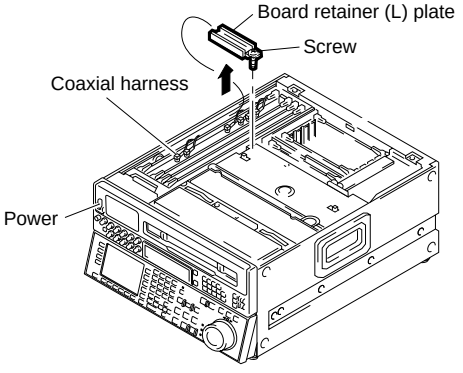
DPR-105 board
Fixing screws PSW3 × 6: 2 pieces
Propping shaft

Installing Procedure

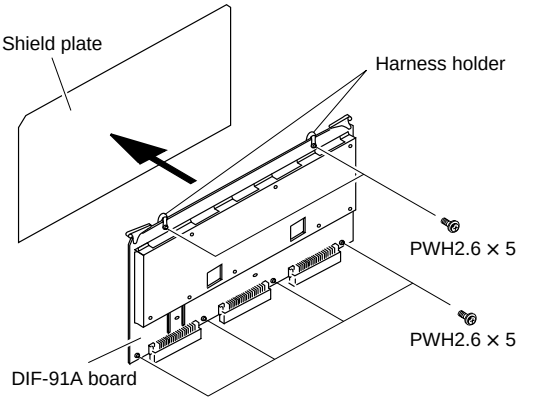
Note

Begin this installation to turn the power off.

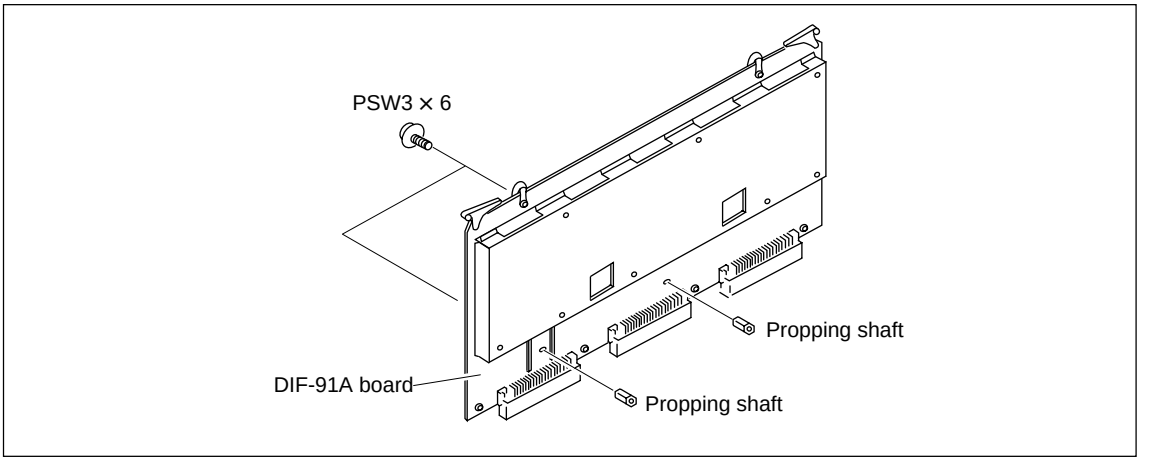
1. Remove the upper lid.
2. Remove the screw, then remove the board retainer (L) plate of HDW-F500.
3. Disconnect the coaxial harnesses (marked with A to H) from the DIF-91A board, then remove the board from HDW-F500. (Refer to Section “2-10-1. Removing/Installing the Plug-in Board”.)



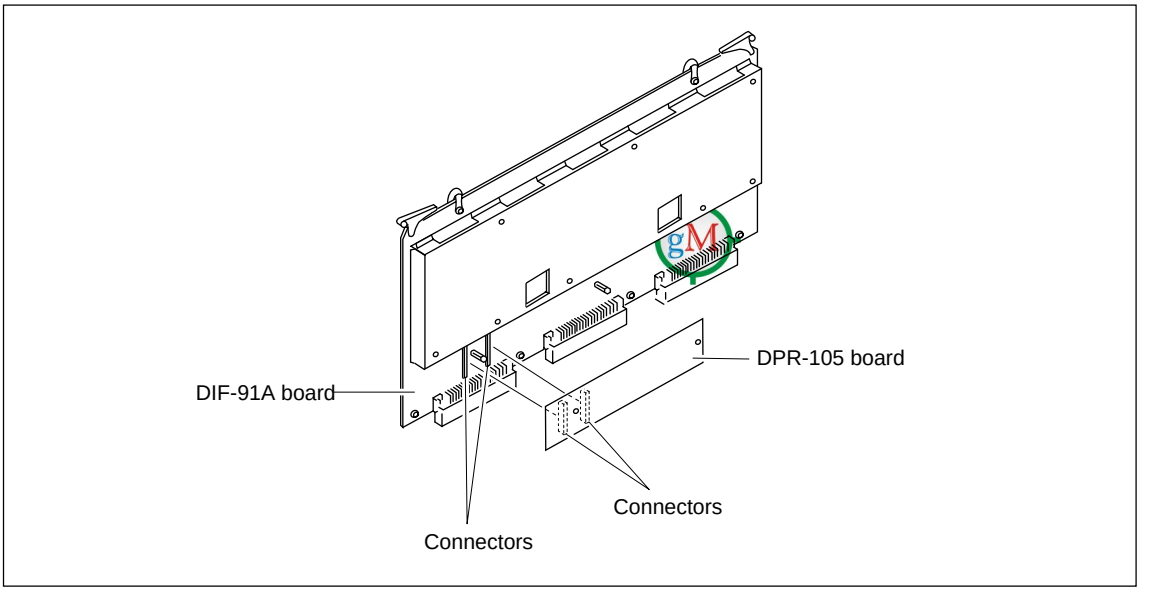
4. Remove six screws (PWH2.6 × 5) and two harness holders of the DIF-91A board, then remove the shield plate.



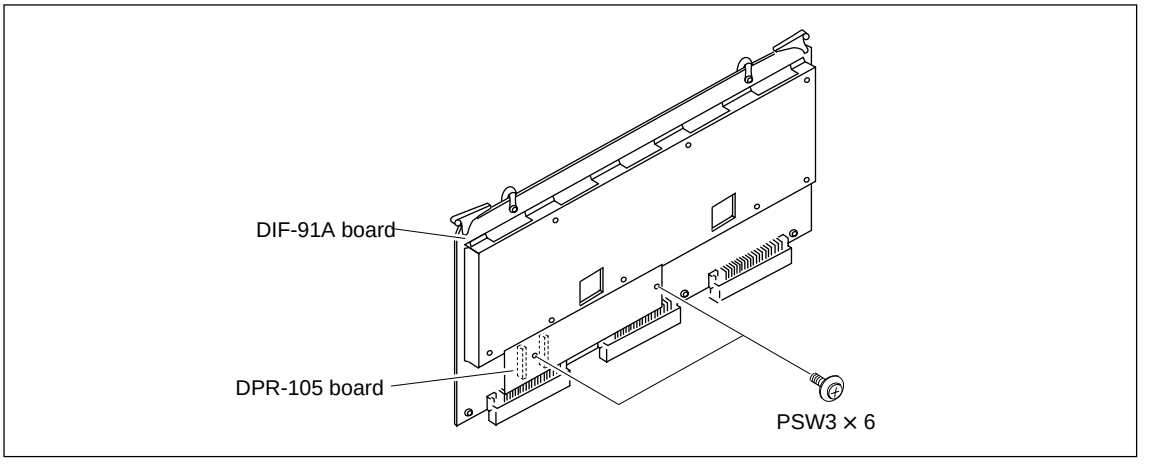
5. Fix the supplied two propping shafts to the DIF-91A board with the supplied two screws (PSW3 × 6) respectively .



6. Insert the connectors of the DPR-105 board into the connectors of the DIF-91A board.



7. Insert the supplied two screws (PSW3 × 6) into the holes of the DPR-105 board, then tighten them toward the propping shaft head respectively.

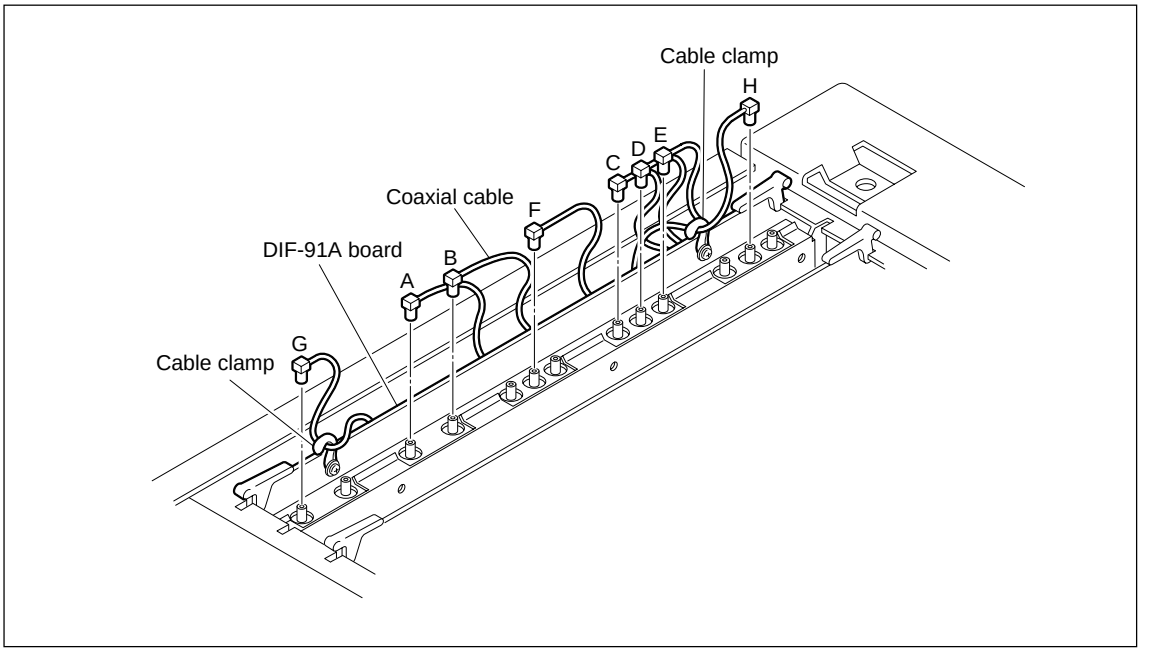


8. Install the shield plate with the removed six screws (PSW2.6 × 5).

Note

On the upper two screws, hang the removed harness holders respectively before tightening them.

9. Insert the DIF-91A board into the specified slot of the HDW-F500.
10. Connect the eight coaxial connectors (A through H) to the specified positions which labeled "A through H" stickers on the DIF-91A board as shown in the below figure.
    After connecting the eight coaxial connectors, fix the coaxial cable G and H with cable clamps.



11. Install the board retainer (L) plate, then install the upper lid to HDW-F500.

1-7-2. HKDV-507

In order to install the HKDV-507 HD pull down board in the unit, the HD SDI signal is outputted converting HD video signal of 1125/23.976PsF (or 1125/24PsF) into HD video signal of 1125/29.97i (or 1125/30i).

Notes

- If the HKDV-507 board is installed, install the HKDV-501A board to the fifth slot from rear side.
- When this unit HDW-F500 is operated at 29.97PsF/30PsF/25PsF, output signal (PULL DOWN OUT on rear panel in this unit) of HKDV-507 is muted.
  However, that signal is outputted for the down converter board (HKDV-501A).

Components

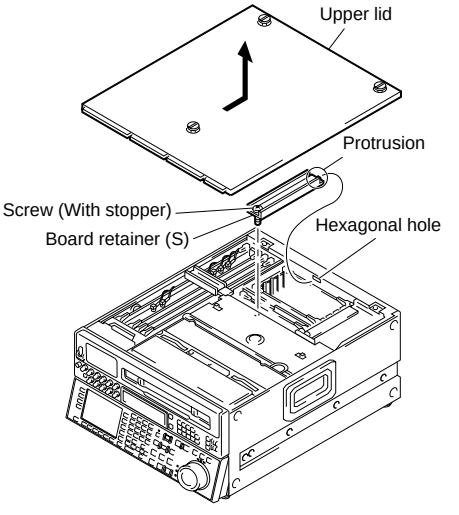
PD-94 board
Sub harness (PD-MD)

Installing Procedure

Note

Begin this installation to turn the power off.
Confirm if the picture of HD SDI output in the unit is no problem beforehand.
If problem is detected, to repair or to adjustment are necessary.

1. Remove the upper lid.
2. After fully loosen the screw, remove the board retainer (S).

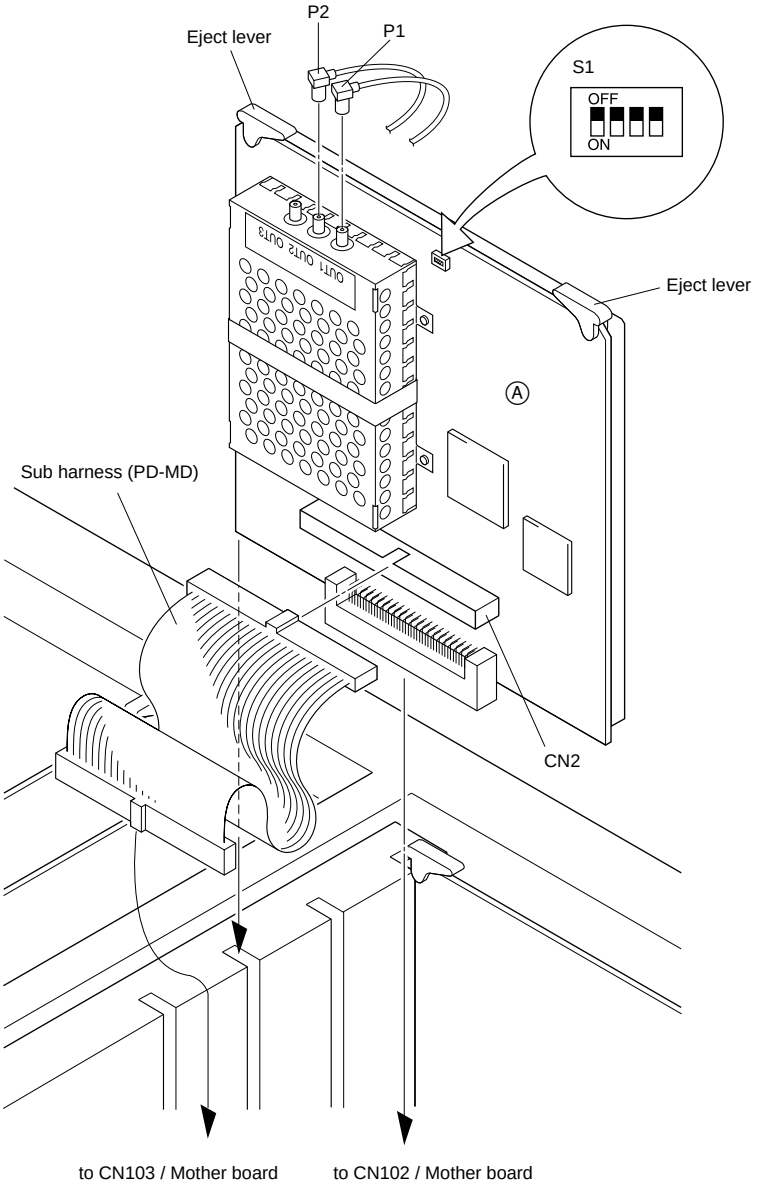


3. Connect one end of the sub harness (PD-MD) to the connector CN103 (the forth connector from rear side) on the motherboard in the unit.
4. Connect the other end of the sub harness (PD-MD) to the connector CN2 on the A side of the PD-94 board.
5. Install the PD-94 board to the third slot from rear side, turning the A side of its board towards front.

Note

After installed the board, pressing towards down both eject lever at the same time.
Install the board to the connector on the motherboard tightly.

6. Connect coaxial harness P1 to OUT1 and coaxial harness P2 to OUT2 each.
7. After insert the protrusion of the board retainer (S) to the hexagonal hole on chassis, fix the board to tighten the screw.
8. Perform “Settings and Checks after Installation”.
9. Attach the upper lid.



Settings and Checks after Installation

After installed HKDV-507 board, perform the following settings and checks.

Procedure

1. Check all turned OFF (upper side), dip switch on PD-94 board (center one side on board).
2. Turn power switch on.
3. Turn to 23.976PsF (or 24PsF) mode in the HDW-F500 unit.
   (1) To maintenance mode menu.
      • Press MAINTENANCE switch by a narrow stick, maintenance information display is appeared on the display.
      • Pressing [SFT] (shift) key and press [F8] (MAINTE EXEC) key to enter to maintenance mode menu.
   (2) Press [F9] (OTHERS CHECK) key to enter to OTHERS CHECK display.
   (3) Press [F9] (SYSTEM MENU) key to enter to SYSTEM MENU display.
   (4) Turn an indication of F2 (HD FRQ) key to “mode1” (or mode2), press [F9] (EXEC) key. “Are you sure?” of confirming message is appeared on the display. If it is OK, press [F9] (EXIT) key.
   SYSTEM REBOOTING is executed, 23.976PsF (or 24PsF) mode setting is completed.
   If “mode1” (or “mode2”) already appears on the display, press [F10] (EXIT) key to exit maintenance mode.
4. Setting VIDEO TEST SIGNAL
   (1) To VTR SETUP menu.
      • Press [SETUP] key, SETUP menu appears on the display.
      • Press [F6] (VTR SETUP) key to enter to VTR SETUP menu.
   (2) Press [F2] (NEXT CATEG) key, change the choice items to “T01:AUTO REPEAT”. Next, press [∨] key , choose “T02:INT ID SG”.
   (3) Press [F7] (CHANGE DATA) key for 2 times, “INTERNAL VIDEO SIGNAL GENERATOR (HD)” turns ON.
   (4) Press [F10] (SAVE/EXIT) key for 2 times, exits VTR SETUP menu.
   (5) Connect VIDEO INPUT on a monitor corresponding HD serial input connector to PULL DOWN OUT (OPTION) connector on connector panel in the unit by a BNC cable.
   Confirm if no problem is the picture on the monitor.

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1-8. Switchable Functions

1-8-1. System Frequency Switchable Function

This unit is able to switch the System frequency to 23.98 PsF, 24 PsF, 25 PsF, 29.97 PsF, 30 PsF, 50 i, 59.94 i, 60 i, and record and playback.

• Refer to the following table for the compatibility of record and playback.

HDW-F500 Compatibility of Record and Playback

SYSTEM / Recording frequency	Playback frequency (Video / Audio)				
	23.976PsF	24PsF	50i / 25PsF	59.94i / 29.97PsF	60i / 30PsF
23.976PsF	○ / ○	○ / ○	○ / ○ ＊1	○ / Mute	○ / Mute
24PsF	○ / ○	○ / ○	○ / ○ ＊1	○ / Mute	○ / Mute
50i / 25PsF	○ / ○ ＊1	○ / ○ ＊1	○ / ○	○ / Mute	○ / Mute
59.94i / 29.97PsF	○ / Mute	○ / Mute	○ / Mute	○ / ○	○ / ○
60i / 30PsF	○ / Mute	○ / Mute	○ / Mute	○ / ○	○ / ○

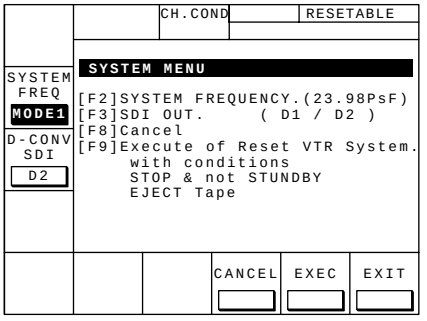
＊1 : As for Audio, Pich corection isn't done.

SYSTEM / Recording frequency	Playback frequency (Time Code)				
	23.976PsF	24PsF	50i / 25PsF	59.94i / 29.97PsF	60i / 30PsF
23.976PsF	○	○	＊2	×	×
24PsF	○	○	＊2	×	×
50i / 25PsF	×	×	○	×	×
59.94i / 29.97PsF	×	×	×	○	○
60i / 30PsF	×	×	×	○	○

＊2 : 9pin out and VITC are effective only when it is select the MENU.
But, LTC does'nt apply to this case.

Switching Procedure

1. Enter the maintenance mode menu.
   (1) Press the MAINTENANCE switch with a sharp tip. The maintenance information display will be shown.
   (2) While pressing the SFT (shift) key, press the F8 (MAINTE EXEC) key to enter the maintenance mode menu.
2. Press the F9 (OTHERS CHECK) key to set the OTHERS CHECK screen.
3. Press the F9 (SYSTEM MENU) key to set the SYSTEM MENU screen.
4. Press the F2 (SYSTEM FREQ) key, select system frequency mode, and press the F9 (EXEC) key. The message to confirm the selection will be displayed. If OK, press the F9 (EXEC) key again. System initialization will be executed, and a new setting will be performed.
5. Turn OFF the power once, and then turn it ON again.



(This screen is an example)

Note

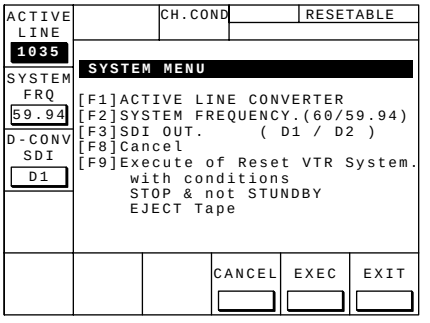
At shipment, 23.98 PsF will be selected.

1-8-2. Line Conversion Switchable Function of HKDV-502 (Option Board)

When the option board HKDV-502 (HD line converter board) has been installed, the number of effective lines of HD SDI OUT are converted and output.
When the option board HKDV-502 (HD line converter board) has been installed, it is possible to convert and output the effective lines of HD SDI OUT.

Switching Procedure

1. Enter the maintenance mode menu.
   (1) Press the MAINTENANCE switch with a sharp tip. The maintenance information display will be shown.
   (2) While pressing the SFT (shift) key, press the F8 (MAINTE EXEC) key to enter the maintenance mode menu.
2. Press the F9 (OTHERS CHECK) key to set the OTHERS CHECK screen.
3. Press the F9 (SYSTEM MENU) key to set the SYSTEM MENU screen.
4. Press the F1 (ACTIVE LINE) key to select “1035,” “1080” or “off,” then press the F9 (EXEC) key. Since the message for confirming the selection is appeared on the display, press the F9 (EXEC) key again if it is okay. System initialization will be executed, and a new setting will be made.
5. Turn OFF the power once, and then turn it ON again.



(This screen is an example)

Notes

- It is set to “off” at shipment.
- The number of effective lines cannot be converted when it is set to off. When it is off, on/off control of picture-quality improvement mode in SLOW mode (setup menu 732) can be performed.
- When the “1035” has been selected, it is correctly converted to the number of effective lines (1035 lines) in accordance with conversion mode of setup menu 730.
- When the “1080” has been selected, it is correctly converted to the number of effective lines (1080 lines) in accordance with conversion mode of setup menu 731.

1-9. Settings of Connector Panel Switches

Set the following switches on the connector panel when installing.
For the setting method, refer to “Section 2. Names and Functions of Parts” in the operation manual.

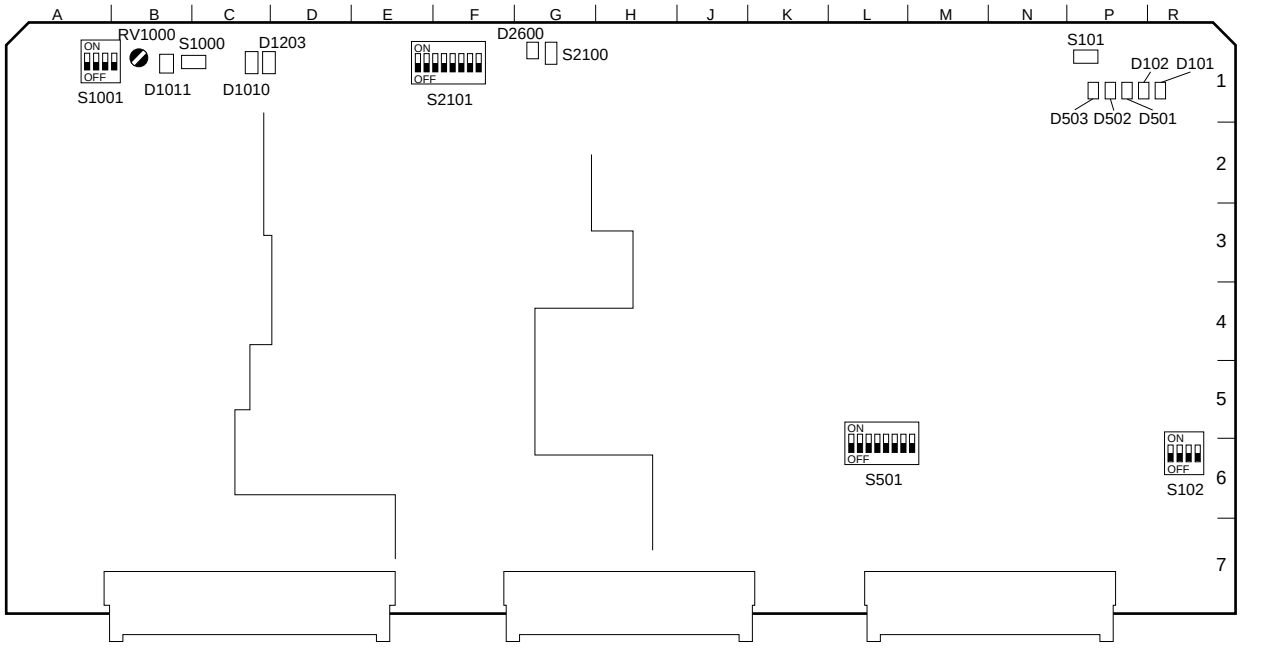
- Setting of audio input level switch: HIGH/LOW, 600 Ω
- Setting of 75 Ω termination switch: 75 Ω ON/OFF

1-10. Settings of Board Switches and Description of LEDs

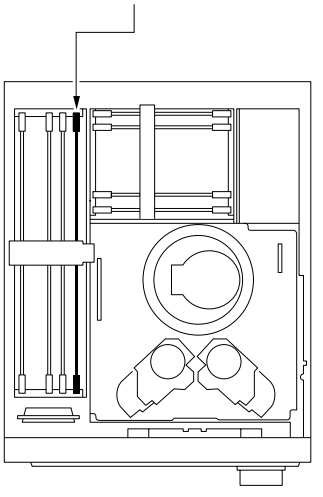
1-10-1. SS-88 Board

Note

Never change the settings of the switches labeled “Factory use”.



SS-88 Board (Side A/Component Side)



<Top View>

Note

For details of how to remove and attach the board, refer to “2-10. Replacing the Plug-in Board”.

SS-88 Board Switches

Switch No.	Name	Function	Setting at Shipment
S101	SYSTEM RESET	Resets and initializes the VTR.	–
S102	–	Factory use	All OFF
S501	–	Factory use	All OFF
S1000	REEL POSITION	• When the power is turned on while pressing the switch, the initial data (constant) of the ROM will be used as the servo adjustment value instead of the NVRAM. • When the cassette compartment is not connected and at the same time no tape is loaded, each time this switch is pressed, the reel table will move from the S position to the L position or vice versa. • At other times, each time this switch is pressed, the tracking mode will switch between FIX (fixed) and VARIABLE (tracking volume is effective). When set to VARIABLE, D1011 will light.	–
S1001	–	Factory use	All OFF
S2100	DT INIT	When the power is turned on while pressing the switch, the adjustment data from the ROM will be loaded instead of the NVRAM.	–
S2101	–	Factory use	All OFF

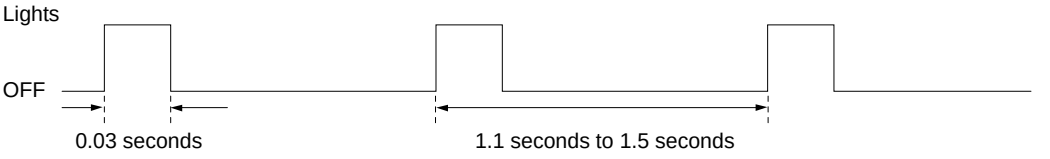
SS-88 Board LEDs

LED No.	Name	Color	Description	Normal State
D101	ERROR1	Red	Blinks when a hardware error occurred in the ⁎SYS1.	Off
D102	SYSTEM	Green	Blinks at 1 second intervals when the ⁎SYS1 microprocessor operates normally.	Blinking
D501	MUTE	Red	Lights when AUDIO is muted.	Off
D502	SYSTEM2	Green	Blinks at 1 second intervals when the SYS2 microprocessor operates normally.	Blinking
D503	ERROR2	Red	Lights when SYSTEM ERROR is detected.	Off
D1010	SV	Green	Performs communication check of the SV system ROM/RAM when the power switch is ON. Lights for several 10 ms every 1 to 2 seconds. Refer to the diagram on the next page for the blinking pattern when errors occur.	Blinking
D1011	VR ON	Red	Light: RV1000 (TRACON VR) can be adjusted. Light off: RV1000 (TRACON VR) can not be adjusted.	Off
D1203	DRUM	Green	Blinks when the drum microprocessor is operating. Normally, lights for 30 ms every 1 second. But when the drum is locked, the blinking interval is reversed.	Blinking
D2600	DT	Green	Performs communication check of the DT system ROM/RAM when the power switch is ON. Refer to the diagram on the next page for the blinking pattern.	Blinking

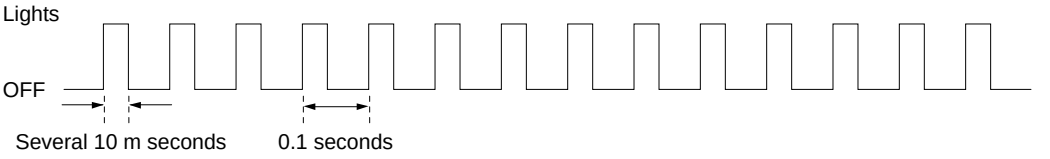
⁎SYS1: Indicates products whose reference numbers are in the 100 or 200 range on the SS-88 board.

(SS-88 Board D1010 Blinking Pattern)

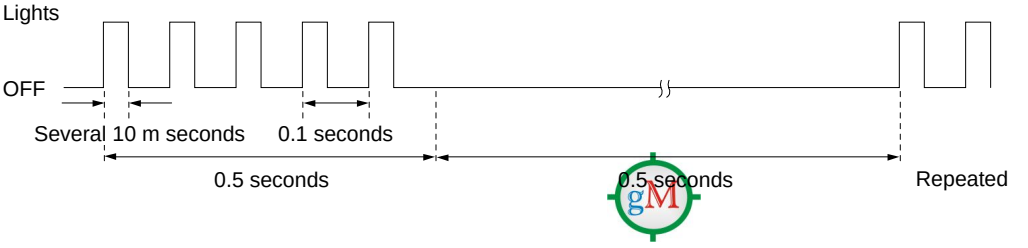
Normal state (SV1 microprocessor)



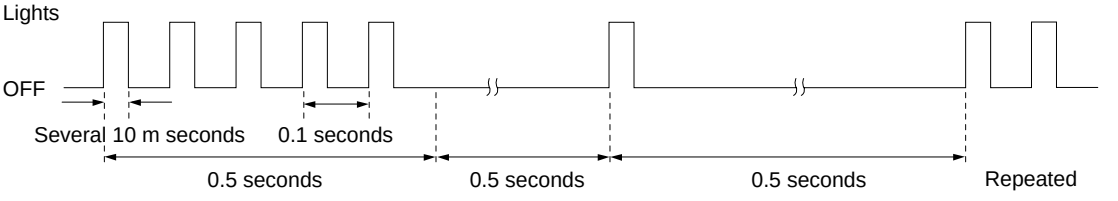
ROM checksum abnormal



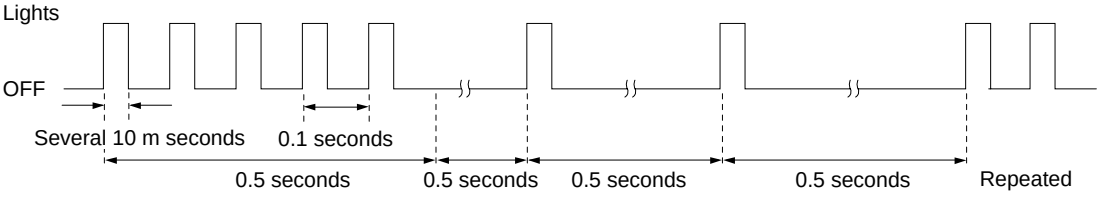
RAM abnormal



System control common RAM abnormal

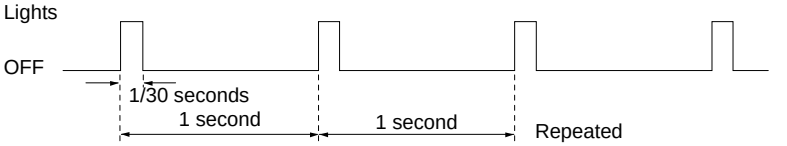


DT common RAM abnormal

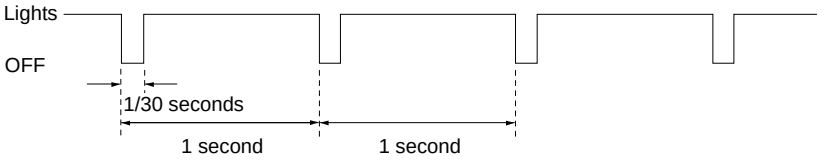


(SS-88 Board D2600 Blinking Pattern)

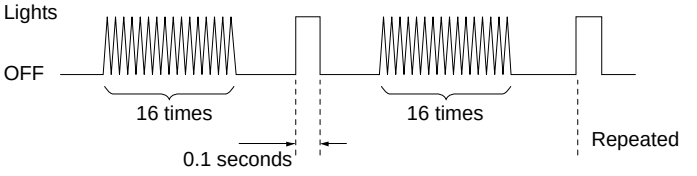
Normal state (DT system): Normal power on



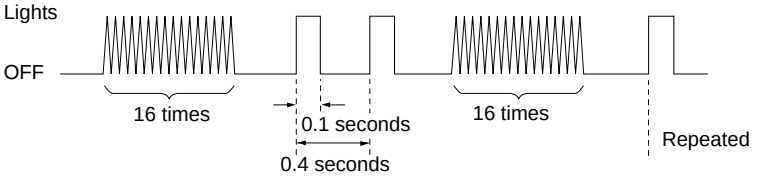
Normal state (DT system): when loading the adjustment data from ROM instead of NVRAM.



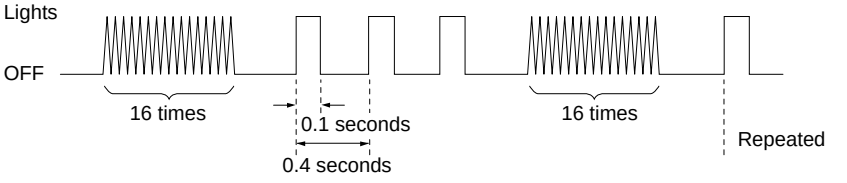
DT ROM checksum error



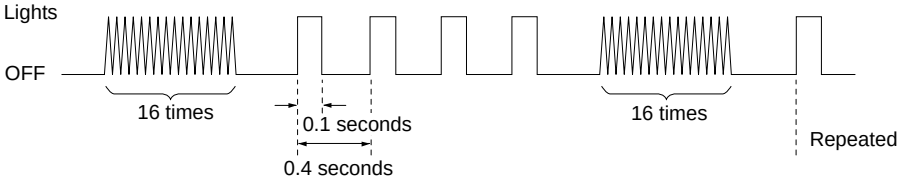
DT RAM write error



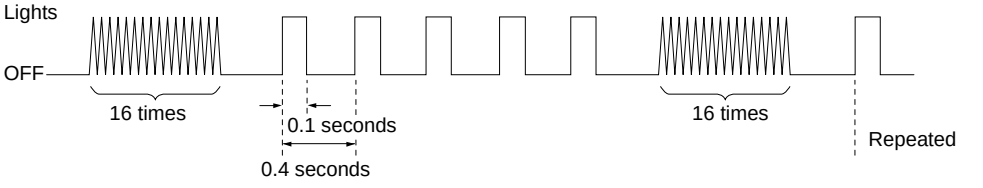
DT common RAM write enable time out



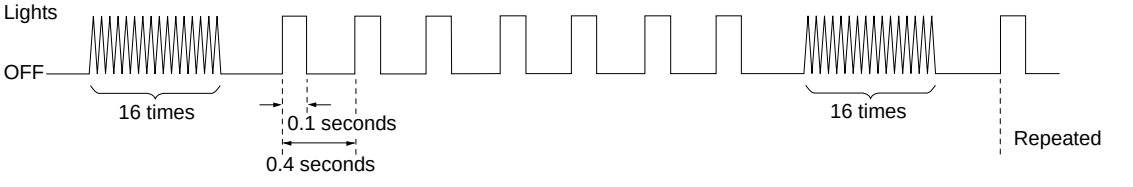
DT common RAM write error



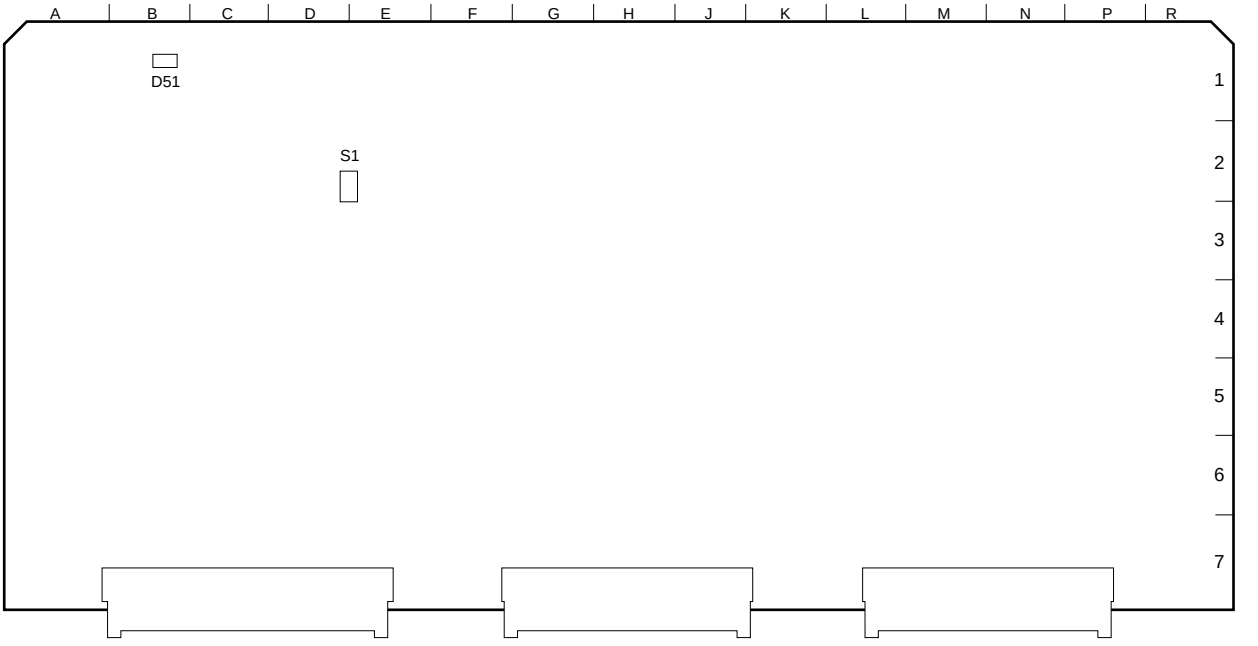
NVRAM data read time out



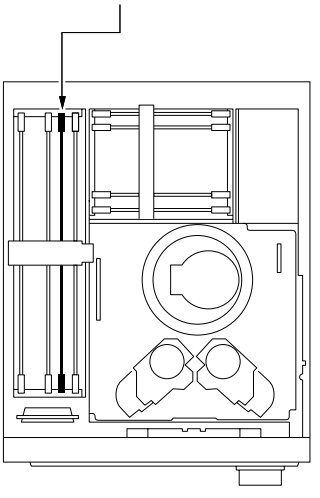
NVRAM checksum error



1-10-2. APR-49 Board



APR-49 Board (Side A/Component Side)



<Top View>

Note

For details of how to remove and attach the board, refer to “2-10. Replacing the Plug-in Board”.

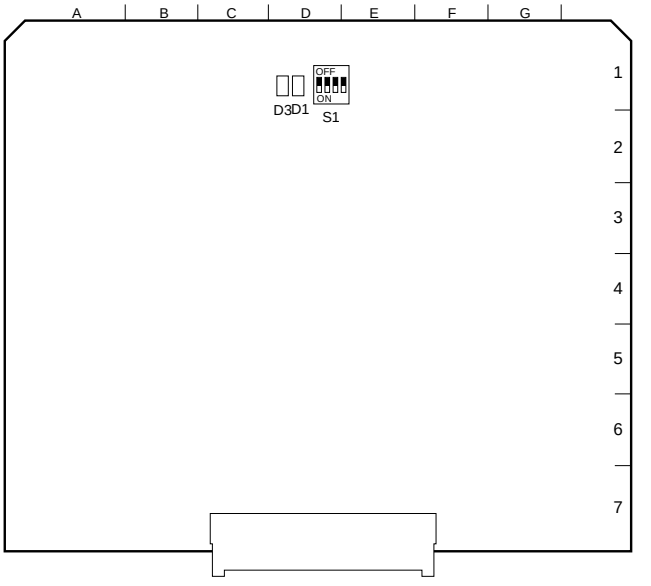
APR-49 Board switches

SW No.	Name	Description	Setting at Shipment
S1	–	Factory use	ALL OFF

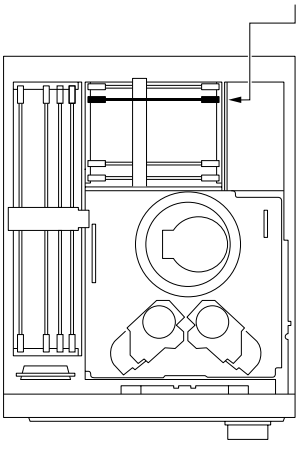
1-10-3. PD-94 Board

Note

Never change the settings of the switches labeled “Factory use”.



PD-94 Board (Side A / Component Side)



<Top View>

Note

For details of how to remove and attach the board, refer to “2-10. Replacing the Plug-in Board”.

PD-94 Board Switches

Switch No.	Name	Function	Setting at Shipment
S1	–	Factory use	ALL OFF

PD-94 Board LEDs

LED No.	Names	Color	Function	Normal State
D1	HALT	RED	POWER ON RESET : ON When ROM can not be read and CPU can not start : OFF When ROM can not be read after CPU start : ON	OFF
D3	RESET	RED	POWER ON RESET : ON When ROM can not be read and CPU can not start : OFF When ROM can not be read after CPU start : ON (dark)	OFF

1-11. Switching of Search Dial Mode

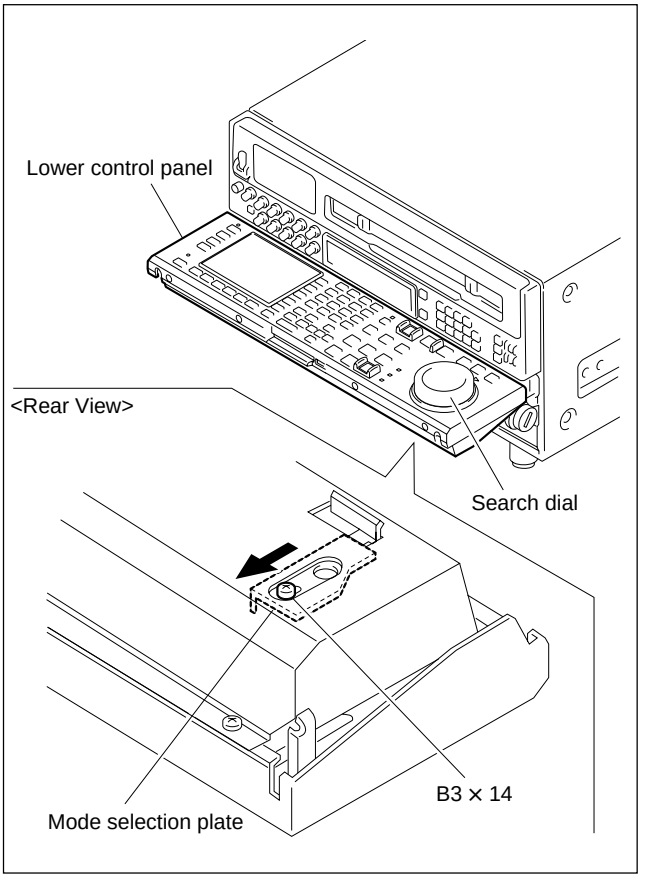
The search dial of this unit can be switched to the jog mode or shuttle mode using the following two methods.

- **By selecting the SHUTTLE/JOG button**
  When the SHUTTLE button is pressed, the shuttle mode is set.
  When the JOG button is pressed, the jog mode is set.

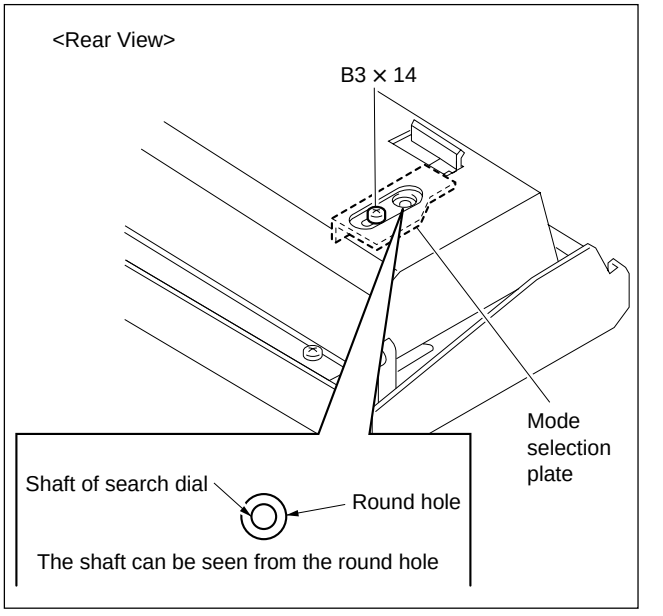
- **By pushing the search dial**
  Each time the search dial is pushed, the mode switches between the shuttle mode and jog mode.
  This method can be validated or prohibited.

Validating the Push Method

1. Turn OFF the power switch and wait for 30 seconds.
2. Fix the lower control panel at 90°.
3. Loosen the screw on the back of the search dial shown in the figure.
4. Slide the mode selection plate in the arrow direction until it touches the end.

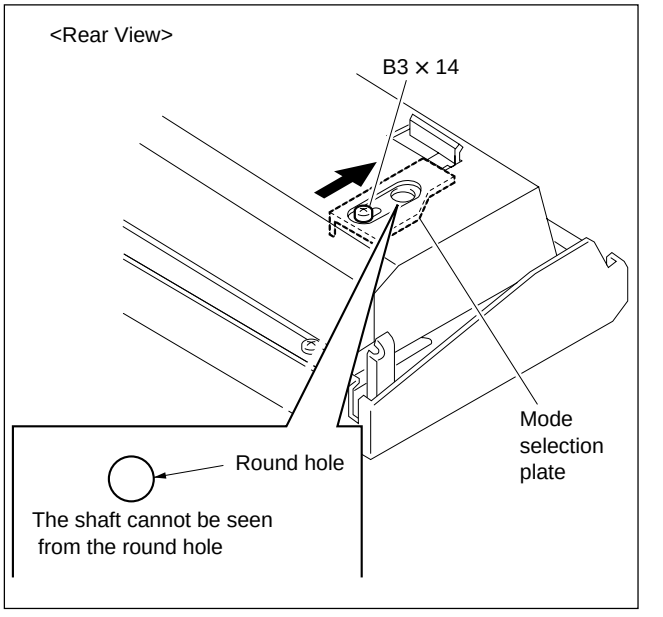


5. Check that the search dial shaft can be seen from the round hole of the mode selection plate, tighten the screw.



Prohibiting the Push Method

1. Turn OFF the power switch and wait for 30 seconds.
2. Fix the lower control panel at 90°.
3. Loosen the screw on the back of the search dial shown in the figure.
4. Slide the mode selection plate in the arrow direction until touches the end.
5. Check that the search dial shaft can be seen from the round hole of the mode selection plate, tighten the screw.



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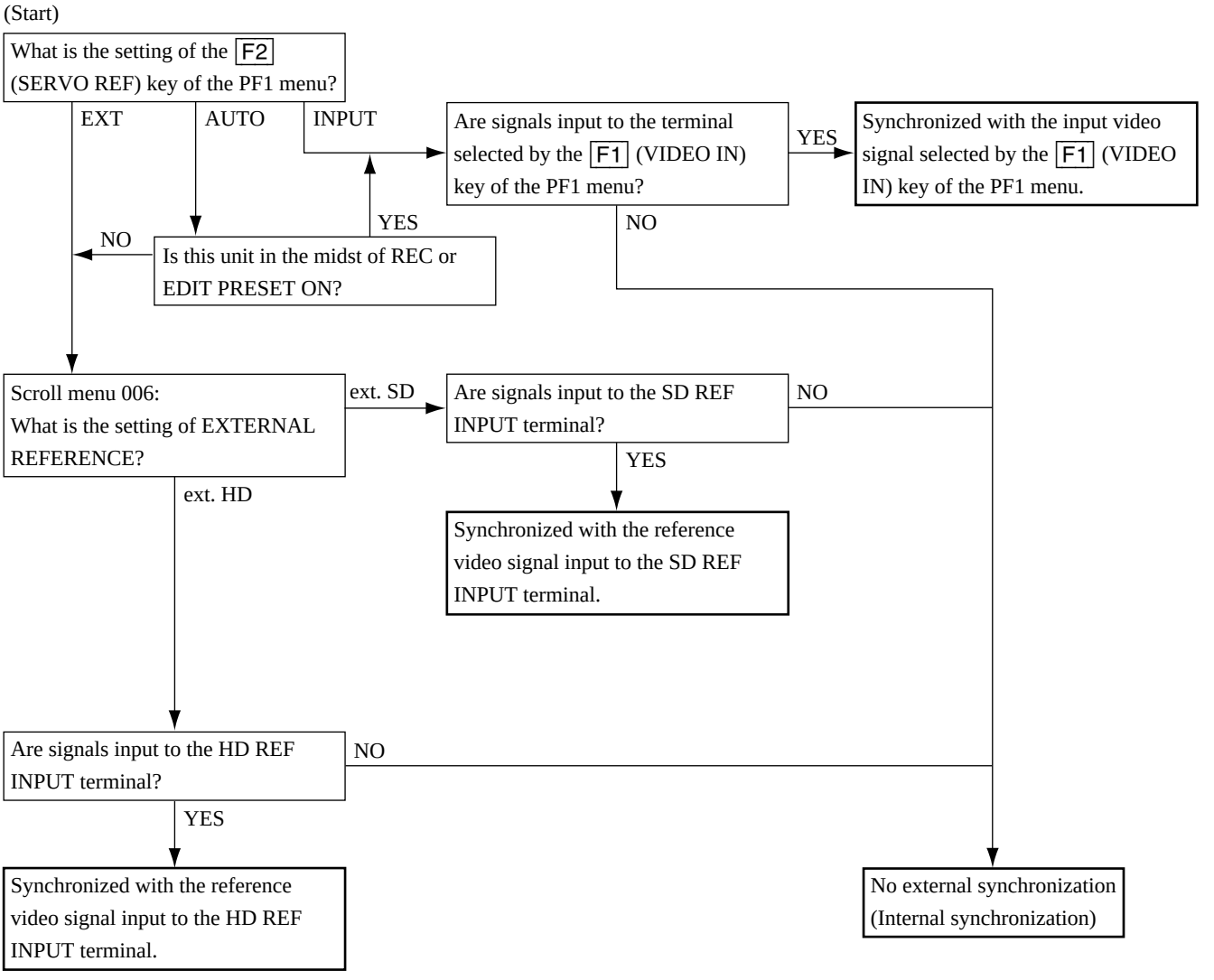
1-12. Reference Systems

This section describes how the reference signals of the output video signals are selected.
The output video signals of this unit are synchronized and output as follows according to the setting of the F2 (SERVO REF) key of the PF1 menu and input signal.


(Start)
What is the setting of the F2 (SERVO REF) key of the PF1 menu?
EXT
AUTO
INPUT
Are signals input to the terminal selected by the F1 (VIDEO IN) key of the PF1 menu?
YES
Synchronized with the input video signal selected by the F1 (VIDEO IN) key of the PF1 menu.
NO
YES
NO
Is this unit in the midst of REC or EDIT PRESET ON?
Scroll menu 006: What is the setting of EXTERNAL REFERENCE?
ext. SD
Are signals input to the SD REF INPUT terminal?
NO
YES
Synchronized with the reference video signal input to the SD REF INPUT terminal.
ext. HD
Are signals input to the HD REF INPUT terminal?
NO
YES
Synchronized with the reference video signal input to the HD REF INPUT terminal.
No external synchronization (Internal synchronization)

1-13. Editor Setup Parameter

When using this unit as editor, set the various setup parameters as follows:

Name of editor: BVE-2000

30 Frame Mode	25 Frame Mode
VTR's standard value	VTR's standard value
1 : 20	1 : 21
2 : E0	2 : E0
3 : 00	3 : 00
4 : 96	4 : 7D
5 : 07	5 : 07
6 : 07	6 : 07
7 : 03	7 : 03
8 : 8A	8 : 8A
9 : 0D	9 : 0D
10 : 05	10 : 05
11 : 00	11 : 00
12 : 00	12 : 00
13 : 81	13 : 81
14 : 3D	14 : 3D
15 : FF	15 : FF

Name of editor: RM-450

Since the VTR DEVICE TYPE doesn't registered, set all switches as follows, then calculates amount of PINCH ON DELAY with LEARN switch.

Left switch	Right switch
SW7 : OFF	SW7 : OFF
SW6 : OFF	SW6 : OFF
SW5 : OFF	SW5 : OFF
SW4 : OFF	SW4 : ON
SW3 : OFF	SW3 : ON or OFF
SW2 : OFF	SW2 : ON
SW1 : OFF	SW1 : OFF
SW0 : OFF	SW0 : ON

Name of editor: BVE-800

Set switch SW5-8 (25/30F) on the MP-17 board to OFF (30F).
Then, set switch SW2 on the BK-807 board as follows:

SW2
SW4 : ON
SW3 : OFF
SW2 : ON
SW1 : ON

Name of editor: BVE-9000, BVE-9100

30 Fame Mode	25 Frame Mode	24 Frame Mode (BVE-9100 Only)	30/25/24 Frame common
CONSTANT-1	**CONSTANT-1**	**CONSTANT-1**	**CONSTANT-2**
BYTE-1 : 20	BYTE-1 : 21	BYTE-1 : 22	BYTE-1 : 0D
BYTE-2 : E0	BYTE-2 : E0	BYTE-2 : E0	BYTE-2 : 05
BYTE-3 : 00	BYTE-3 : 00	BYTE-3 : 00	BYTE-3 : 00
BYTE-4 : 96	BYTE-4 : 7D	BYTE-4 : 78	BYTE-4 : 00
BYTE-5 : 07	BYTE-5 : 07	BYTE-5 : 07	BYTE-5 : 85
BYTE-6 : 07	BYTE-6 : 07	BYTE-6 : 07	BYTE-6 : 3D
BYTE-7 : 03	BYTE-7 : 03	BYTE-7 : 03	BYTE-7 : FF
BYTE-8 : 8A	BYTE-8 : 8A	BYTE-8 : 8A	BYTE-8 : 5A

VTR CONFIGRATION
BYTE-2 : 03
BYTE-3 : 88
BYTE-4 : 81
BYTE-5 : 04

Name of editor: BVE-600, BVE-900

30 Frame Mode	25 Frame Mode	30/25 Frame common
BLOCK-1	**BLOCK-1**	**BLOCK-2**
BYTE-1 : 20	BYTE-1 : 21	BYTE-1 : 0D
BYTE-2 : E0	BYTE-2 : E0	BYTE-2 : 05
BYTE-3 : 00	BYTE-3 : 00	BYTE-3 : 00
BYTE-4 : 96	BYTE-4 : 7D	BYTE-4 : 00
BYTE-5 : 07	BYTE-5 : 07	BYTE-5 : 81
BYTE-6 : 07	BYTE-6 : 07	BYTE-6 : 3D
BYTE-7 : 03	BYTE-7 : 03	BYTE-7 : FF
BYTE-8 : 8A	BYTE-8 : 8A	

Other editors

Set EDIT/ EE DELAY TIME to 5 frames.

Section 2
Service Overview

2-1. Notes on Power Supply Block

2-1-1. Primary Circuit Block and Warning on Electrical Hazards

WARNING

The primary circuit consists of the AC-204 board with AC inlet, the circuit breaker, the POWER switch, and the power supply unit.
Take precautions against electrical hazards when performing maintenance and service operations with the power turned on.
The primary voltage continues to be supplied to the AC-204 board, circuit breaker, and POWER switch even after the POWER switch is turned off. For operations which require no current conduction, turn off the POWER switch and disconnect the power cord.

2-1-2. Resetting the Circuit Breaker

The circuit breaker of the primary circuit is mounted on the power panel of this unit. When an overcurrent flows in the primary circuit, the breaker operates and the button protrudes.
If the breaker operates, eliminate the cause of the flow of the overcurrent, and the push the button.

2-2. Cleaning Clogged Heads

Clean using a cleaning cassette tape (specified product: BCT-HD12CL) when the rotary heads are clogged.
For the cleaning, refer to “5-2-2. Cleaning by Cleaning Cassette Tape”.

WARNING

Clean the rotary heads in the prescribed procedure using a specified cleaning cassette tape. If not, the rotary heads may be a brasive or damaged.

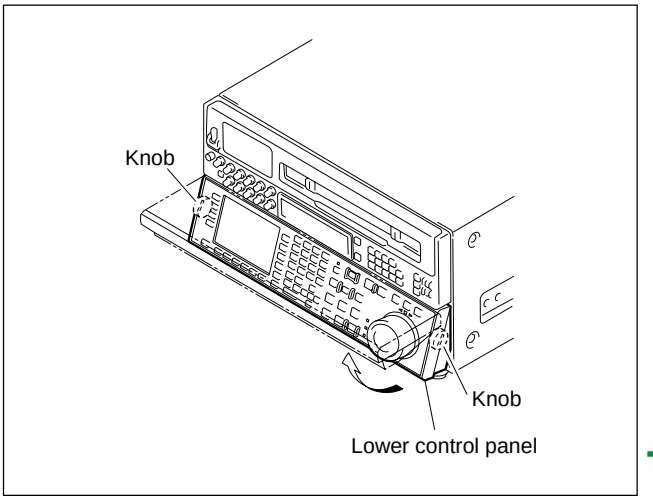
If the head clogging is not solved using a cleaning cassette tape, use cleaning cloth.
For the cleaning using a cleaning cloth, clean according to the procedure of “5-2-3. Cleaning the Rotary Heads” after confirming the cautions and preparation in “5-2-1. Cleaning by Cleaning Cloth.

2-3. Opening/Closing the Lower Control Panel

1. The lower control panel can be moved up to the 90° position by lifting it.

Note

The inclination of the lower panel can be adjusted by about 15° each time between 15° and 90°. When tilting it in use, rotate the two knobs inside the panel to the right and secure the panel.



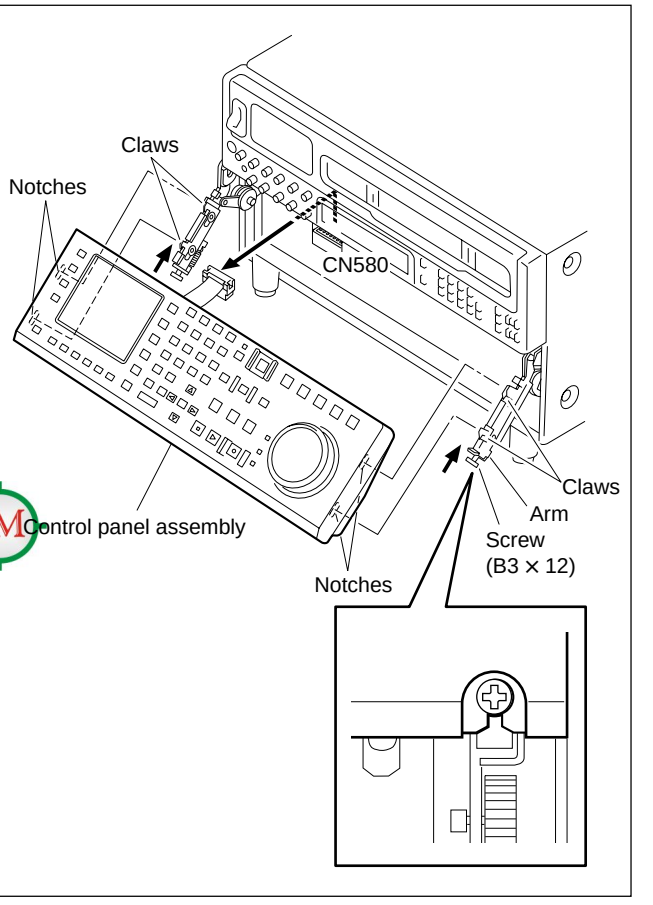
2-4. Removing/Installing the Lower Control Panel Assembly

Note

Be sure to turn off the POWER switch and unplug the power cord before starting the removal/installation.

Removing

1. Secure the lower control panel at 30°.
2. Disconnect the flat cable connector (CN580).
3. Loosen the screws on both sides of the panel assembly (until the heads of the screws can be seen completely).
4. Push the loosened screws in the arrow direction simultaneously, and in this state, lift up the lower control panel assembly, and remove it.



Installing

5. Secure the arm at 30°.
6. Adjust the notches at the back of the lower control panel assembly (rear side) to the claws on the arm, and push until a click sound is heard.

   Reference Information

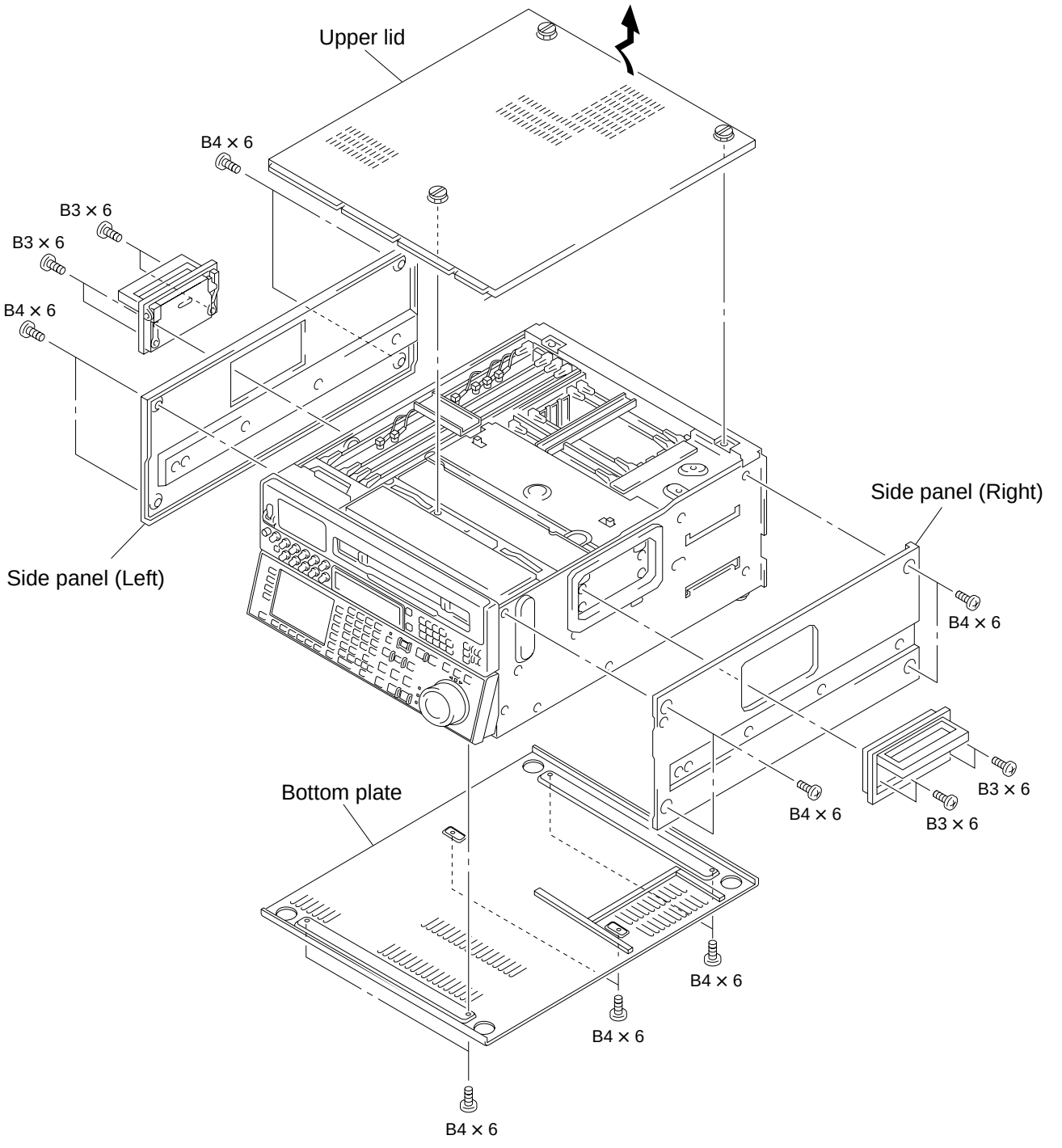
   If the claws are stiff, they can be set to the notches more easily by pressing the heads of the screws of the arm.
7. Tighten the two screws.
8. Connect the connector of the flat cable (CN580).
9. Return the lower control panel to 15°.

2-5. Removing/Installing Cabinet

2-5-1. Removing/Installing the Upper Lid, Side Panels, Bottom Plate

Note

Be sure to turn off the POWER switch and unplug the power cord before starting the removal/installation.



Be sure to use the specified screws.

Upper Lid

1. Loosen the three screws with stopper.
2. Lift up the connector panel side of the upper lid, and pull it out in the arrow direction.

To install, perform the reverse order of this procedure.

Side Panels (Same for left and right)

1. Remove the four screws (B3 × 6) and remove the handle.
2. Remove the four screws (B3 × 6) and remove the side panels.

To install, perform the reverse order of this procedure.

Bottom Plate

Note

- With the handle attached, place the unit with its right side panel facing down for removal and installation. Hold the lower handle with your hand so that it does not hang down.

1. Remove the six screws, and remove the bottom plate.

To install, perform the reverse order of this procedure.

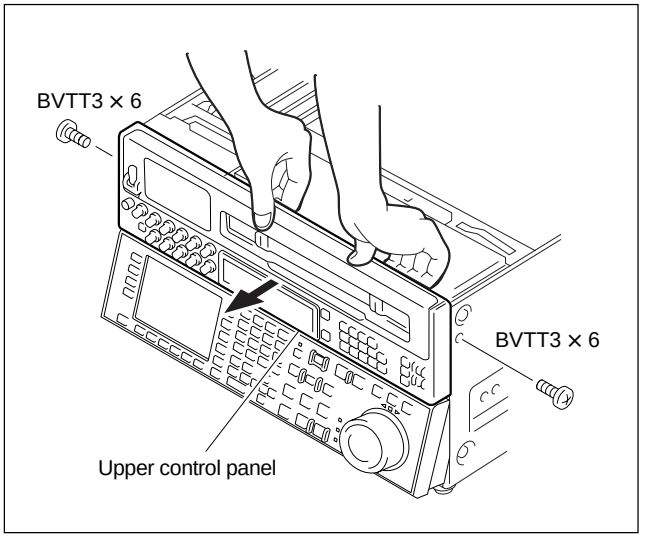
2-5-2. Removing/Installing the Upper/Lower Control Panels

Note

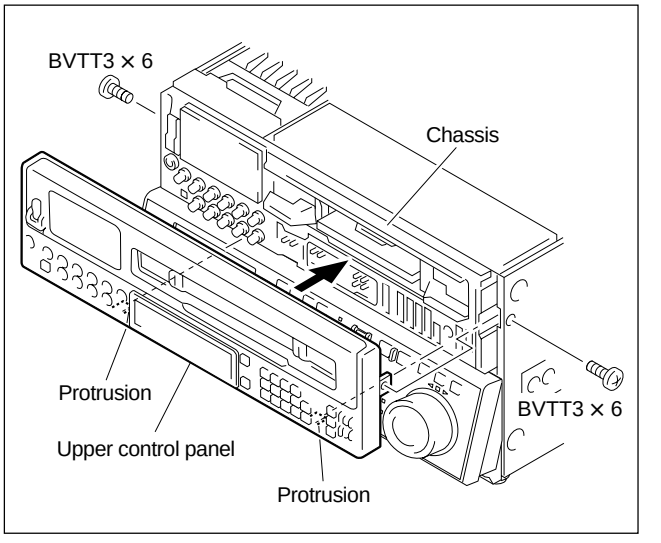
Be sure to turn off the POWER switch and unplug the power cord before starting the removal/installation.

Upper Control Panel

1. Remove the upper lid.
   (Refer to "2-5-1. Removing/Installing the Upper Lid, Side Panels, Bottom Plate".)
2. Remove each screw on the left and right.
3. Insert your fingers between the panel and chassis, and pull out the edge of the panel to remove it.



4. When installing, match the protrusions of the panel to the holes on the chassis, and secure with the screws.

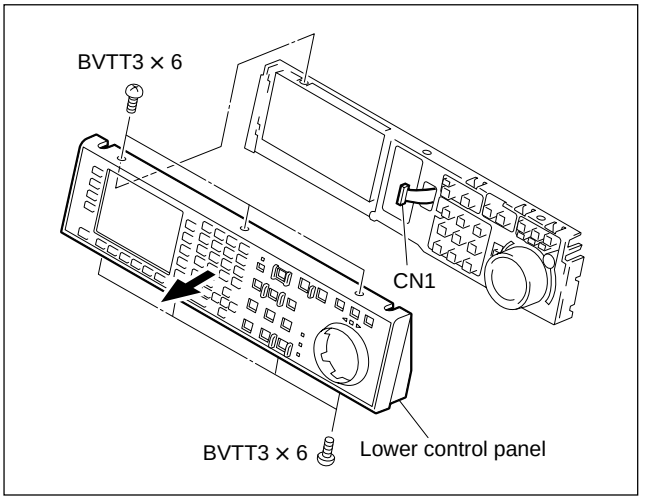


Lower Control Panel

Note

Be sure to remove the memory card before beginning removal/installation.

1. Remove the control panel assembly from the unit. (Refer to "2-4. Removing/Installing the Lower Control Panel Assembly".)
2. Remove the seven screws at the top and bottom.
3. Disconnect the connector (CN1) from the SW-749 board.
4. Remove the lower control panel in the arrow direction.



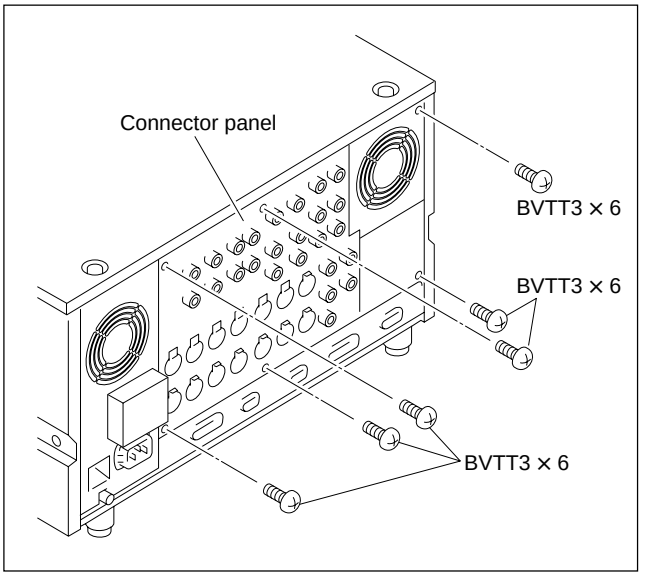
To install, perform the reverse order of this procedure.

2-5-3. Removing/Installing the Connector Panel Assembly

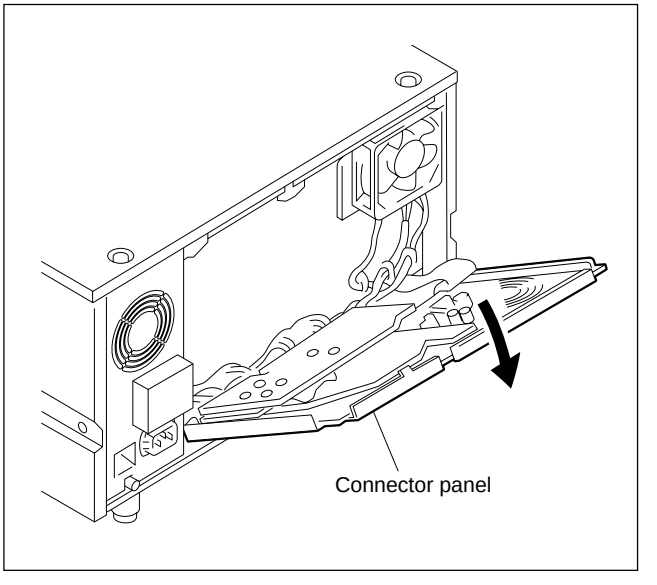
CAUTION

To prevent electrical hazards, be sure to turn off the POWER switch and unplug the power cord before starting the removal/installation.

1. Remove the six screws shown "⇒" marks on the connector panel.



2. Open forward the connector panel, but do not pull the harnesses.



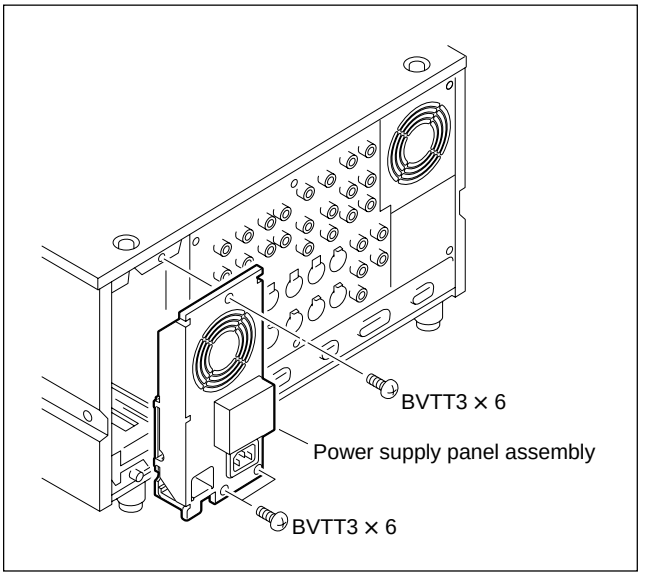
To install, perform the reverse order of this procedure.

2-5-4. Removing/Installing the Power Supply Panel Assembly

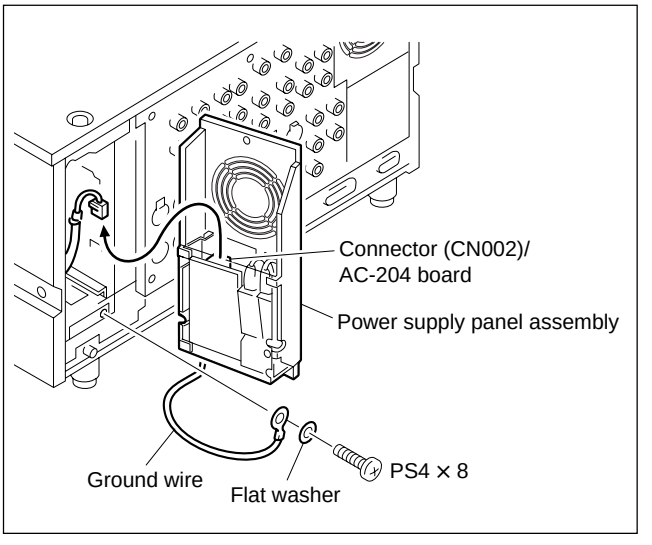
CAUTION

To prevent electrical hazards, be sure to turn off the POWER switch and unplug the power cord before starting the removal/installation.

1. Remove the three screws, and pull out the power supply panel assembly.



2. Disconnect the harness from the connector (CN002) of the AC-204 board.
3. Remove the screw fixing the ground wire to the chassis and the flat washer, then remove the power supply panel assembly.



To install, perform the reverse order of this procedure.

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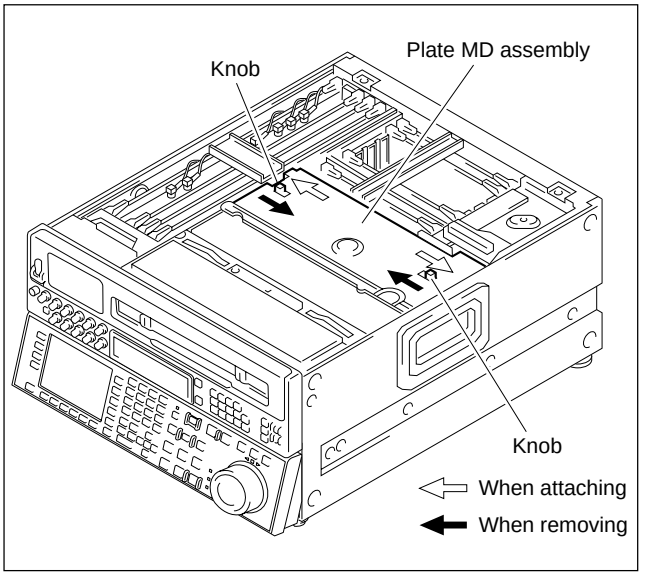
2-6. Removing/Installing the Plate MD Assembly

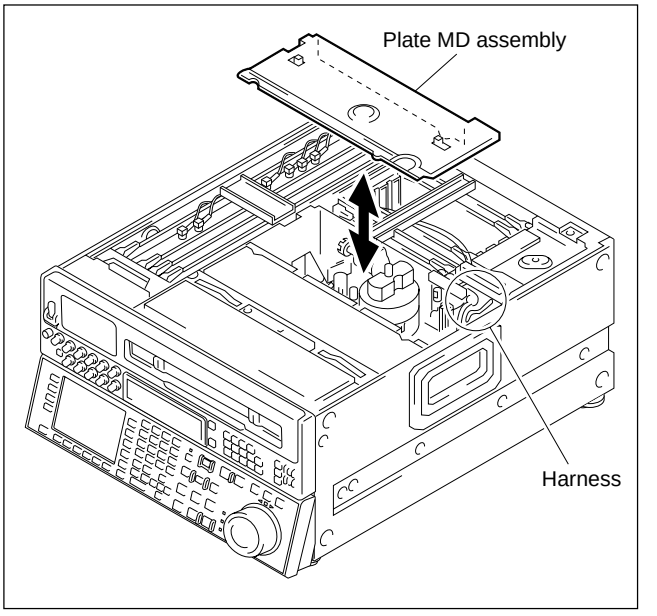
Note

Be sure to turn off the POWER switch and unplug the power cord before starting the removal/installation.

1. Remove the upper lid.
   (Refer to “2-5-1. Removing/Installing the Upper Lid, Side Panels, Bottom Plate”.)
2. Sliding the two knobs on the plate MD assembly inside. (Slide the knobs outside will secure the plate MD assembly.)



3. Remove the plate MD assembly.



To install, perform the reverse order of this procedure.

Note

Be careful not to sandwich the harnesses passing under the plate MD assembly.

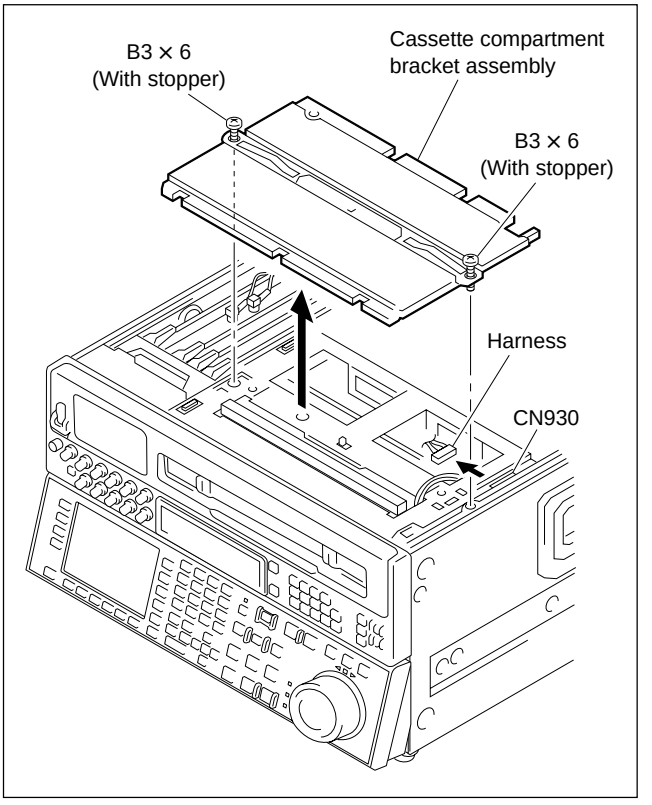
2-7. Removing/Installing the Cassette Compartment

Notes

- Be sure to turn off the POWER switch and unplug the power cord before starting the removal/installation.
- The cassette compartment cannot be removed with the cassette tape loaded. Press the EJECT button with the power turned on and eject the cassette tape.
  If the cassette compartment does not move due to electrical problems, remove the cassette tape with your hand. (Refer to "2-12. Removing the Cassette Tape When Tape Slack Occurs".)

Removing

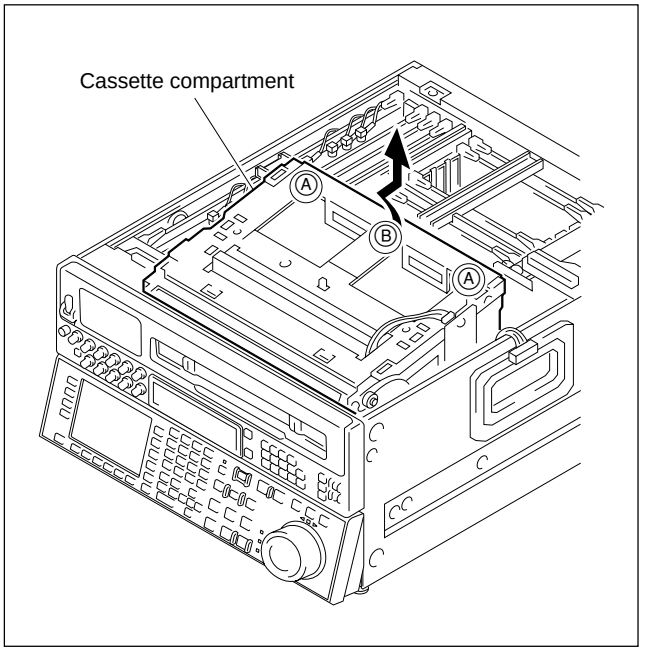
1. Remove the upper lid.
   (Refer to "2-5-1. Removing/Installing the Upper Lid, Side Panels, Bottom Plate".)
2. Remove the plate MD assembly.
   (Refer to "2-6. Removing the Plate MD Assembly.")
3. Loosen the two screws, and remove the cassette compartment bracket assembly.
4. Disconnect the harness from the connector (CN930) of the CL-29 board, and secure the harness where it will not come in the way.



5. Hold the cassette compartment at the two parts Ⓐ, and lift up the cassette compartment slightly (about 1 cm). When the four cassette compartment positioning legs are disconnected from the four positioning holes on the mechanical deck, move the cassette compartment backwards (about 1 cm) to the position where the cassette door can be completely seen when viewed from directly above.
6. Hold the cassette compartment at part Ⓑ and raise the cassette compartment upwards slowly, and remove it.

Notes

- Raise the cassette compartment slowly while sliding it back and forth so that the gear on the right of the cassette compartment does not touch the chassis.
- Never move the cassette compartment to the right and left. If unnecessary force is applied in the left and right directions, the gear or one of the parts may come off.
- Place the cassette compartment with the cassette door facing up, or with the cassette compartment positioning legs down.
  (If cassette door faces down, the flexible card wire may be damaged.)



2-8. Circuit Structure

The numbers given to the boards in this section are used also in “2-9-1. Location of Printed Circuit Board.”

System	Number	Board	Circuit Function
Digital process	1	DIF-91A	HD serial digital interface with Embedded audio
	2	DPR-104	Digital data processor (Editing process board)
	3	DPR-143	Digital data processor (Encoder/Decoder, Error correction)
	4	RX-46	HD serial digital interface RX module
	5	TX-68	HD serial digital interface TX module
RF/Analog process	6	APR-49	Audio signal processor(A-D, D-A, AES/EBU interface)
	7	CUE-10	CUE, TC REC/PB and LAU PB circuit
	8	EQ-85	RF equalizer (REC current cont., PB EQ, Analog BETACAM PB buffer)
System/Servo control	9	DR-307	Motors (Drum, Reel, Capstan, etc.) driver, Solenoids driver
	10	DT-34C	DT driver
	11	SS-88	System, Servo, DT control
Motherboard	12	MB-863	Motherboard
Connect	13	HN-264	Connection board (Drum, etc.) with REC inhibit sensor
	14	HN-265	Connection board (Threading motor, etc.)
	15	HN-266	Connection board with Dew sensor
Option	16	DCP-26	HD-SD-converter (Optional board HKDV-501A)
	17	DPR-105	Digitral data processor (HD line converter board) (Optional board HKDV-502)
	18	RX-46	HD serial digital interface RX module for Dub-in (Optional board HK-202)
	19	TX-68	HD serial digital interface TX module for Dub-out (Dubbing interface board) (Optional board HK-201)
	20	TX-68	HD serial digital interface TX module (Optional board HKDV-507)
	21	PD-94	HD serial digital interface converter (Optional board HKDV-507)
Power	22	AC-204	AC connector board with Breaker
	23	PSW-51	DC-DC converter
	24	Power supply unit	Switching regulator
Front panel function	25	CP-266A	CPU board for Control panel
	26	FP-103	Panel function (Switches, LEDs) control, CAV control level conversion
	27	KY-330A	SW board for Control panel
	28	PTC-69	Search dial sensor
	29	SWC-17E	Upper panel function (Switches, LEDs)
	30	SW-749	Function control switches
	31	SWC-37	Int/Ext Control panel select
	32	VR-152	Audio REC level VRs
	33	VR-153	Audio PB level VRs
Rear panel function	34	CP-348	Rear panel connector board (Analog video signal buffer)
	35	CP-349	Rear panel connector board (Analog/Digital audio, TC)

System	Number	Board	Circuit Function
Mech. deck driver/sensor	36	CCM-15	Reel shift motor
	37	CCM-15	Threading motor
	38	PD-35	Pinch solenoid connection
	39	PTC-54	Threading FG
	40	PTC-59	Cassette's holes sensor
	41	PTC-71	Reel position sensor
	42	RM-181	S reel motor
	43	RM-181	T reel motor
	44	SE-344	S reel FG
	45	SE-344	T reel FG
	46	TR-78	S tension sensor
	47	TR-79	T tension sensor, Threading-end and Unthreading-end sensors
Cassette compartment driver/sensor	48	CL-29	Cassette up/down motor, Cassette down sensors
	49	LP-81	Lamp of cassette compartment
	50	PC-70	Cassette-in sensors, Cassette size sensor

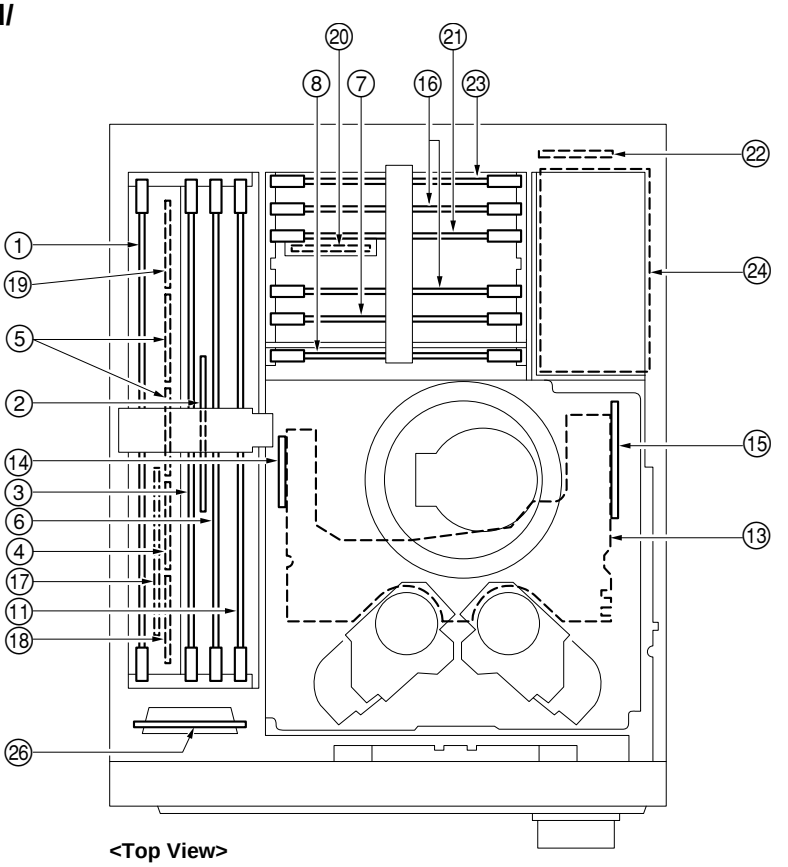
2-9. Location of Main Parts

2-9-1. Location of Printed Circuit Board/ Switching Regulator

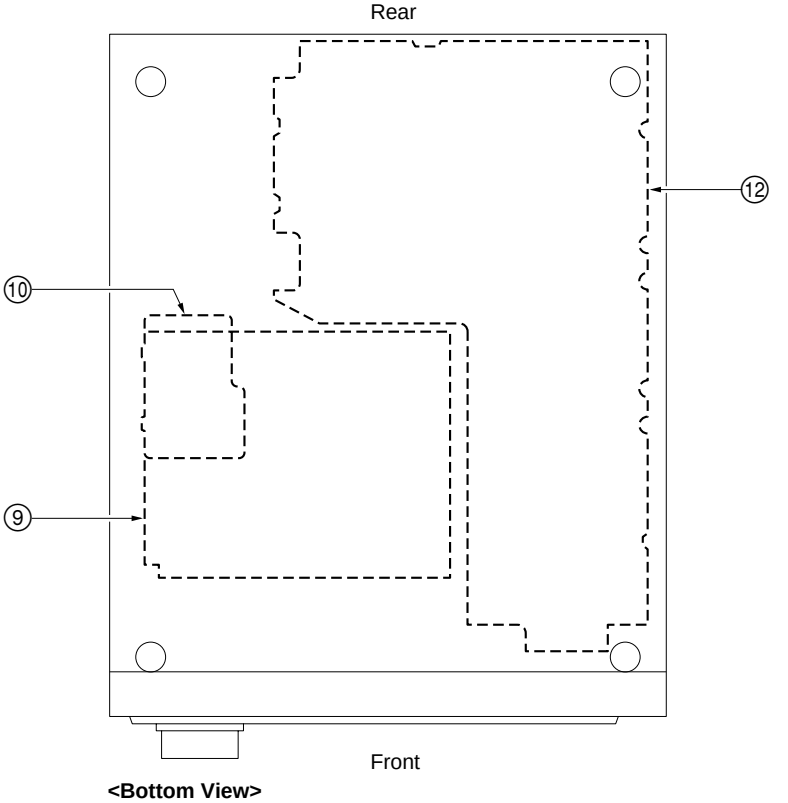
AC-204 ..... ㉒
APR-49 ..... ⑥
CCM-15 ..... ㊱ ㊲
CL-29 ..... ㊽
CP-266A ..... ㉕
CP-348 ..... ㉞
CP-349 ..... ㉟
CUE-10 ..... ⑦
DIF-91A ..... ①
DPR-104 ..... ②
DPR-143 ..... ③
DR-307 ..... ⑨
DT-34C ..... ⑩
EQ-85 ..... ⑧
FP-103 ..... ㉖
HN-264 ..... ⑬
HN-265 ..... ⑭
HN-266 ..... ⑮
KY-330A ..... ㉗
LP-81 ..... ㊾
MB-863 ..... ⑫
PC-70 ..... ㊿
PD-35 ..... ㊳
PSW-51 ..... ㉓
PTC-54 ..... ㊴
PTC-59 ..... ㊵
PTC-69 ..... ㉘
PTC-71 ..... ㊶
RM-181 ..... ㊷ ㊸
RX-46 ..... ④
SE-344 ..... ㊹ ㊺
SS-88 ..... ⑪
SW-749 ..... ㉚
SWC-17E ..... ㉙
SWC-37 ..... ㉛
TR-78 ..... ㊻
TR-79 ..... ㊼
TX-68 ..... ⑤
VR-152 ..... ㉜
VR-153 ..... ㉝

DCP-26 ..... ⑯ (HKDV-501A)
DPR-105 ..... ⑰ (HKDV-502)
RX-46 ..... ⑱ (HK-202)
TX-68 ..... ⑲ (HK-201)
PD-94 + TX-68 ..... ㉑ + ⑳ (HKDV-507)

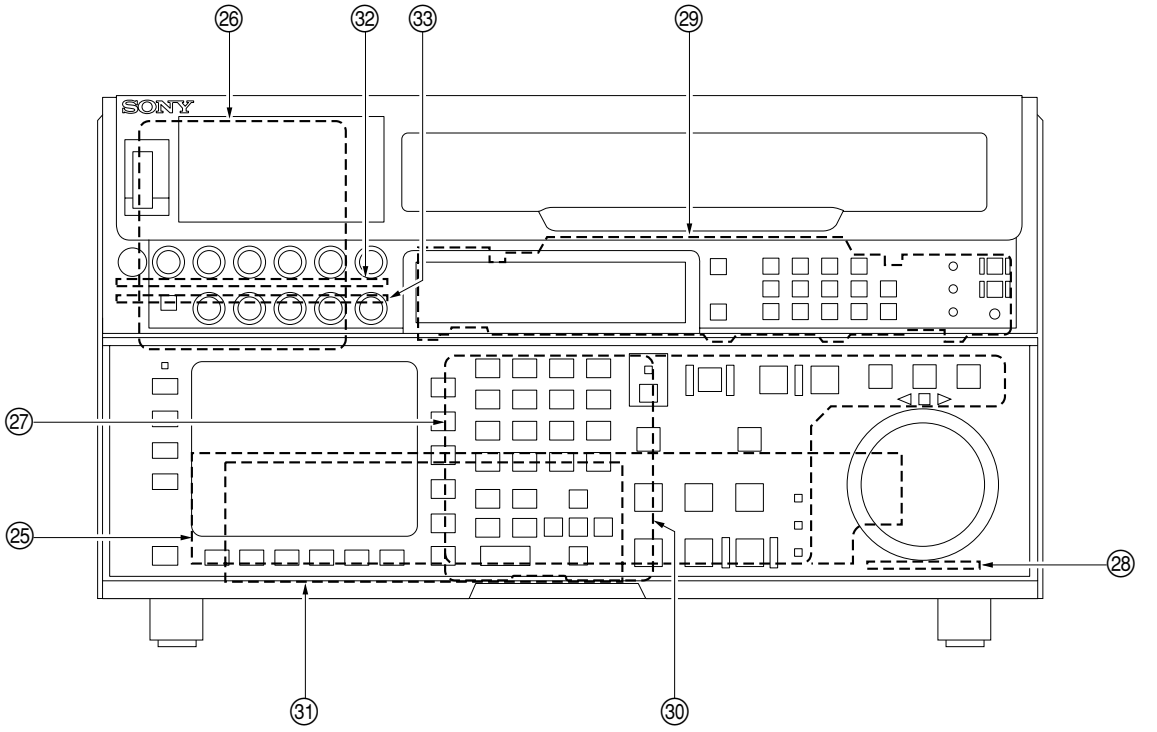
Switching regulator ..... ㉔



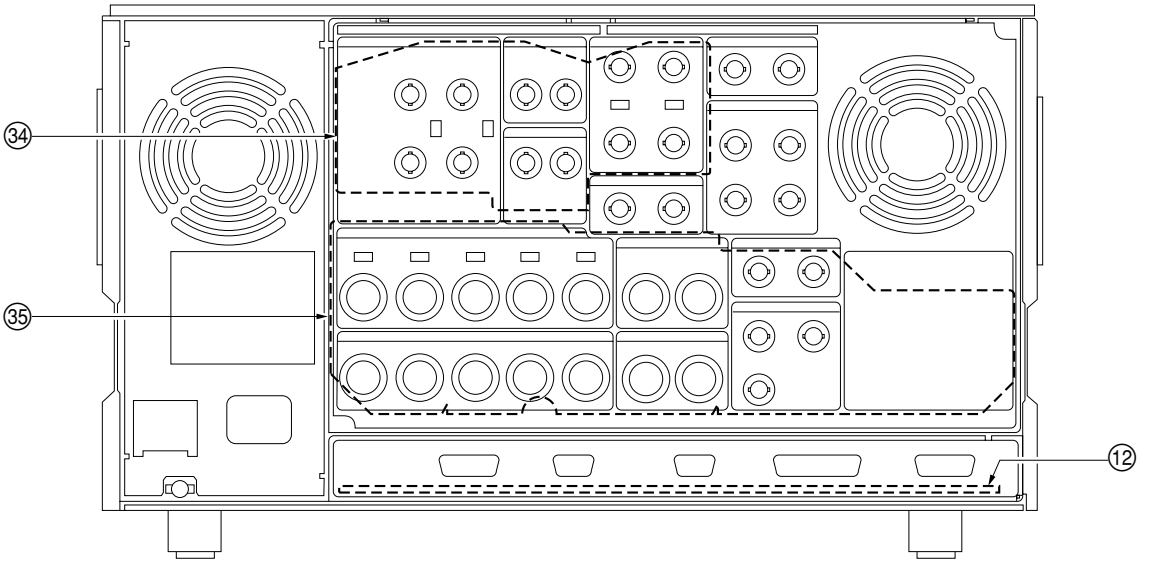
<Top View>

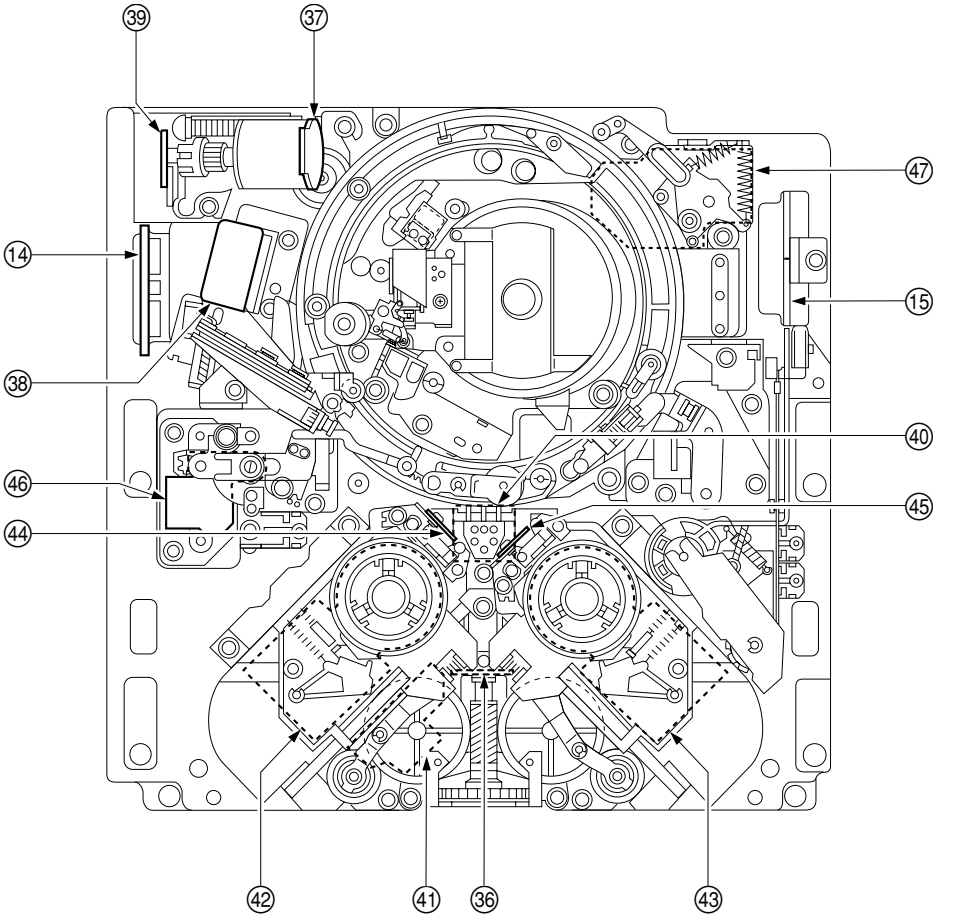


<Bottom View>

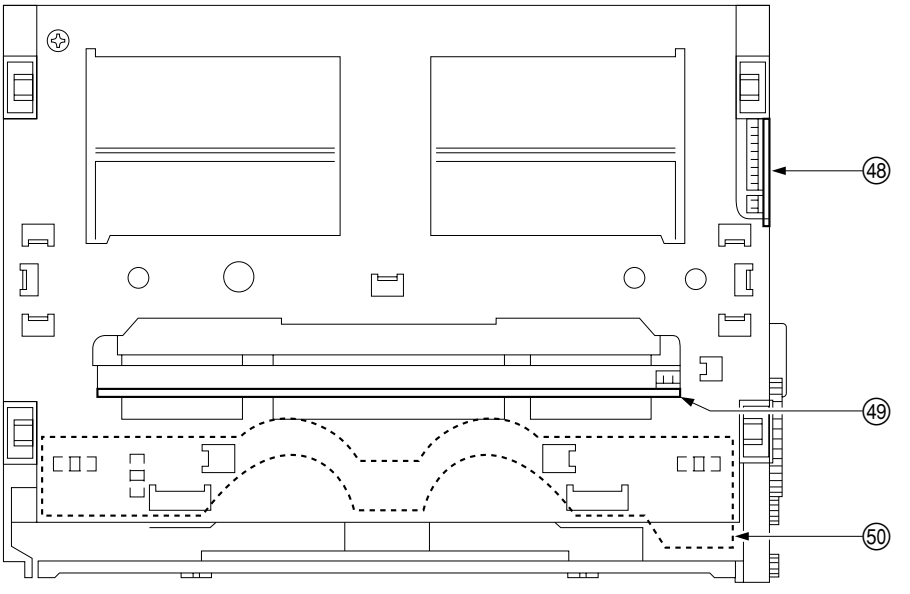


<Front View>



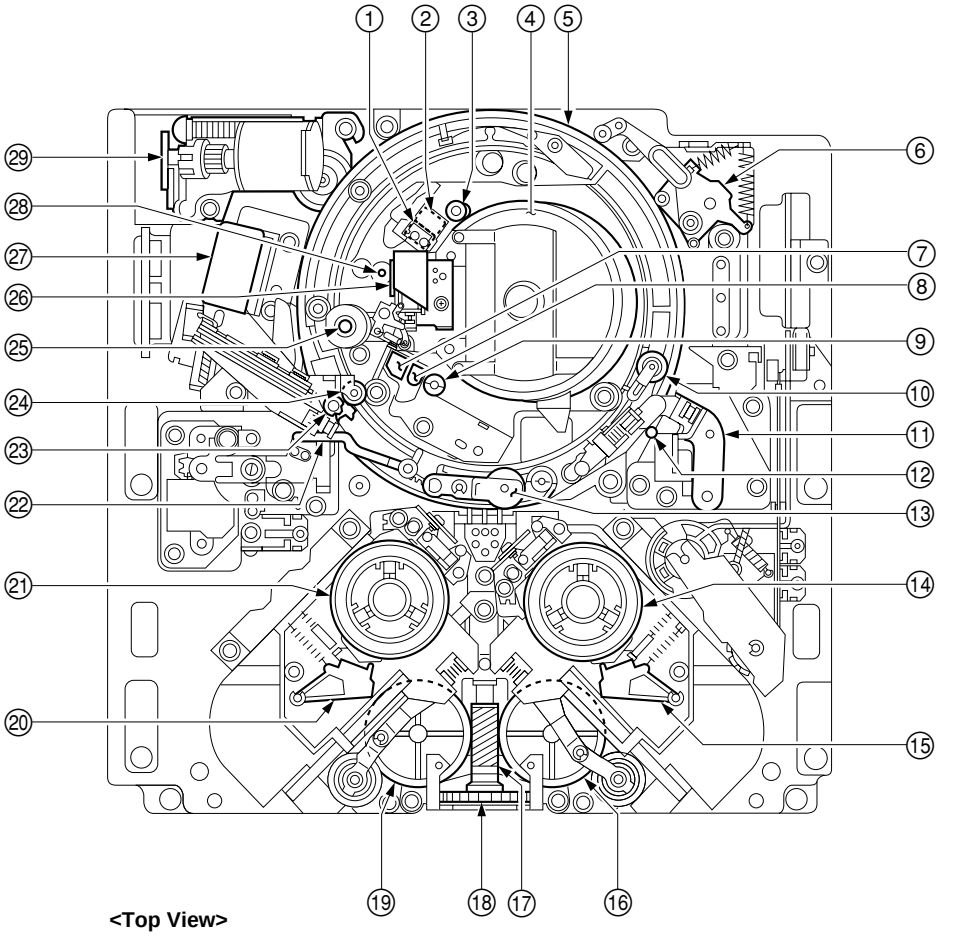


<Top View>



<Cassette Compartment Top View>

2-9-2. Location of Major Mechanical Parts

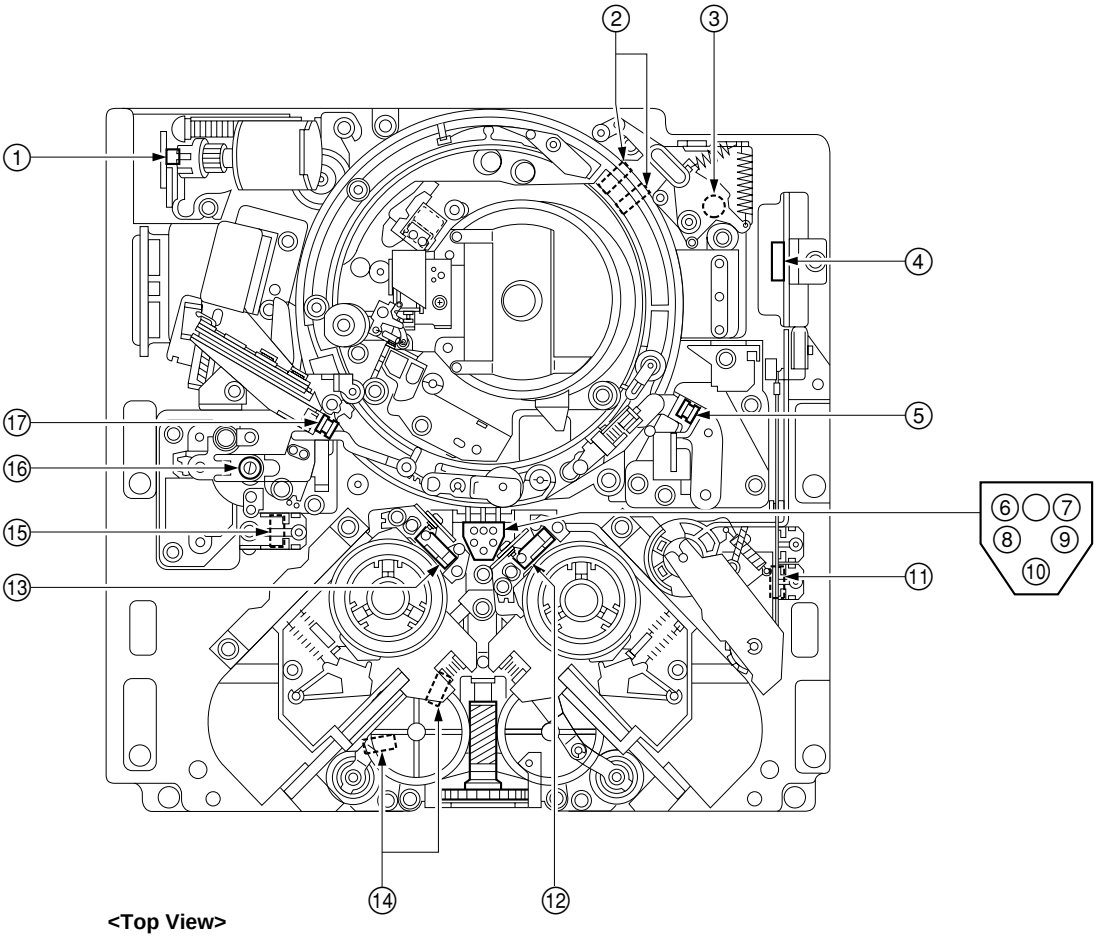


<Top View>

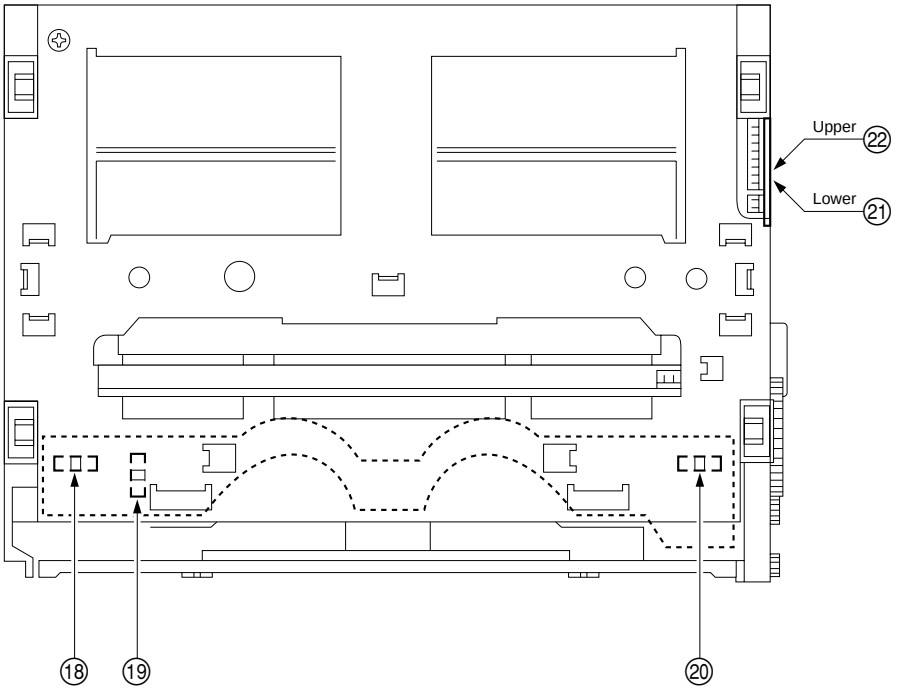
INDEX

① AT head
② AT erase head
③ TG-3 tape guide
④ Drum
⑤ Threading ring
⑥ T tension regulator arm
⑦ FE head
⑧ CTL head
⑨ TG-2 tape guide
⑩ AT head cleaner
⑪ T drawer arm
⑫ TG-10 tape guide
⑬ Pinch roller
⑭ T side reel table
⑮ T side brake assembly
⑯ T side worm wheel
⑰ Worm gear
⑱ Drive gear
⑲ S side worm wheel
⑳ S side brake assembly
㉑ S side reel table
㉒ S tension regulator arm
㉓ Tape cleaner
㉔ TG-0 tape guide
㉕ Capstan (Shaft)
㉖ Cleaning roller block
㉗ Pinch compression block
㉘ TG-4 tape guide
㉙ threading ring gear block

2-9-3. Location and Function of Sensors



<Top View>



<Cassette Compartment Top View>

① **Threading motor FG sensor**
This sensor detects the rotation speed of the threading motor.
The FG output of this detection sensor enters the servo circuit, and controls the threading/unthreading speed to protect the tape from damages during threading.

② **Threading/unthreading sensors**
These sensors detect whether the threading ring has reached the threading-end or unthreading-end position.

③ **T tension regulator arm sensor**
This sensor detects the position of the tension arm and controls the reel torque to keep the T side tape tension constant during recording and playback.

④ **Condensation sensor**
This sensor detects whether condensation has occurred in the unit or not.

⑤ **Tape top sensor**
This sensor detects the tape end of the tape running in the REV direction.

⑥ **Cleaning cassette tape sensor**
This sensor detects whether the cassette inserted is the normal cassette tape or cleaning cassette tape using the tab on the back of the cassette.

⑦ **Tape thickness sensor**
This sensor detects the thickness of the tape wound around the cassette inserted in the unit using the tab on the back of the cassette.

⑧⑨⑩ **Cassette classification sensors**
These sensors detect whether the three cassette type detection tabs on a cassette are present or not, to discriminate if the cassette can be used in this unit or not.

⑪ **L cassette REC inhibit sensor**
This sensor (switch) detects the REC inhibit plug of the large cassette.

⑫ **T reel table FG sensor**
This sensor detects the rotation speed of the take-up reel table.
The FG output of this sensor is input to the servo circuit to control the rotation speed of the reel motor.

⑬ **S reel table FG sensor**
This sensor detects the rotation speed of the supply reel table.
The FG output of this sensor is input to the servo circuit to control the rotation speed of the reel motor.

⑭ **Reel L/S position sensor**
These sensors detect whether the reel table moves to the correct position according to the size of the inserted cassette.

⑮ **S cassette REC inhibit sensor**
This sensor (switch) detects the REC inhibit plug of small cassettes.

⑯ **S tension regulator arm sensor**
This sensor detects the position of the tension arm and controls the reel torque to keep the T side tension constant during recording and playback.

⑰ **Tape end sensor**
This sensor detects the end of the tape that runs in the forward direction.

⑱ **Cassette-in sensor (L)**
This sensor detects whether a cassette is being inserted or not.

⑲ **Cassette L/S size sensor**
This sensor detects whether the cassette inserted is L size or S size.

⑳ **Cassette-in sensor (R)**
This sensor detects whether a cassette is being inserted or not.

㉑ **Cassette-down (2) sensor**
㉒ **Cassette-down (1) sensor**
These sensors detect the movement of the cassette compartment by the combination of the ON/OFF of the cassette-down (2) sensor, cassette-down (1) sensor and cassette-in sensor.

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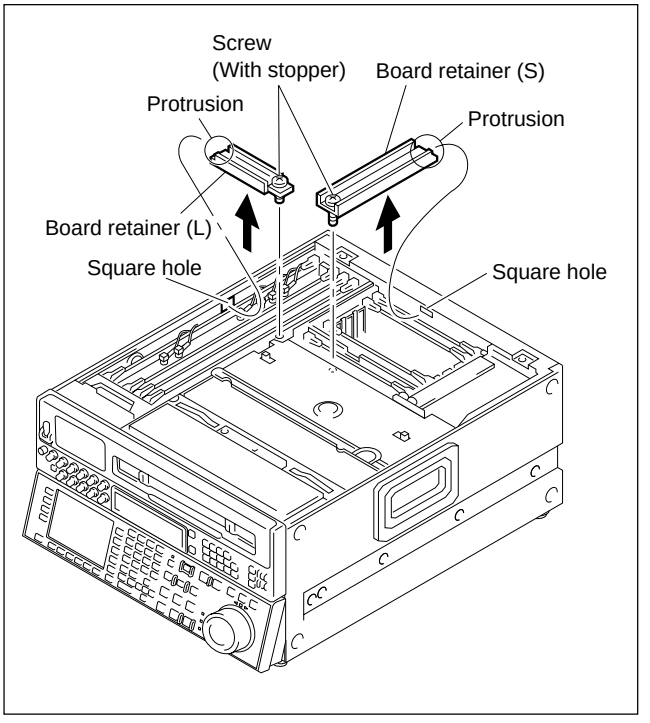
2-10. Replacing the Plug-in Board

2-10-1. Removing/Installing the Plug-in Board

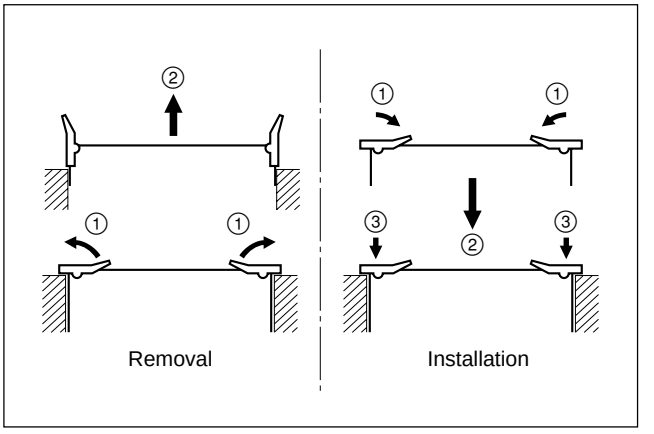
Note

Be sure to turn off the POWER switch and unplug the power cord before starting the removal/installation.

1. Remove the upper lid.
   (Refer to "2-5-1. Removing/Installing the Upper Lid, Side Panels, Bottom Plate".)
2. Loosen the screw, and remove the board retainer (L) or (S).



3. In the case of the DIF-91A board or DCP-26 and PD- 94 boards
   Remove the harnesses connected to the board removed:
   DIF-91A board: Six pieces
   DCP-26 board: Three pieces
   PD-94 board: Two pieces and one flat cable
4. Push up the eject levers on the two sides of the board removed in the arrow direction.
5. Hold the eject levers and slowly pull them straight up.



To install, perform the reverse order of this procedure.

Notes

- After inserting the board, push the two eject levers from the top at the same time, and connect to the connector of the mother board (MB-863 board) properly.
- When installing the board retainer, insert the protrusion into the square hole on the chassis and then tighten the screws.

2-10-2. Point to Notice When Replacing the SS-88 Board

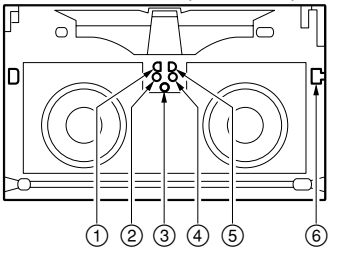
Perform the store of data before replacing the SS-88 board. According to the procedure of replacement, refer to the Section 1-2-2 in the maintenance manual parts 2 volume1.

2-11. Mechanism of Cassettes

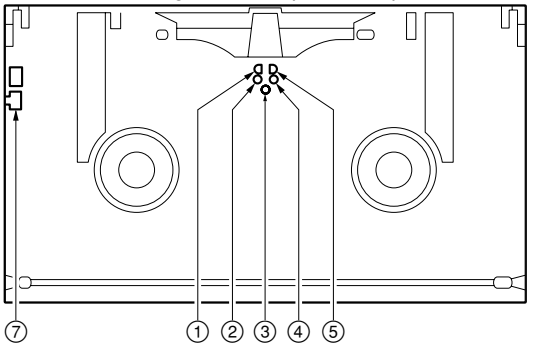
There are REC inhibit plugs and various detection tabs on the back of the cassette tape.

HDCAM cassette

Small cassette (S cassette)

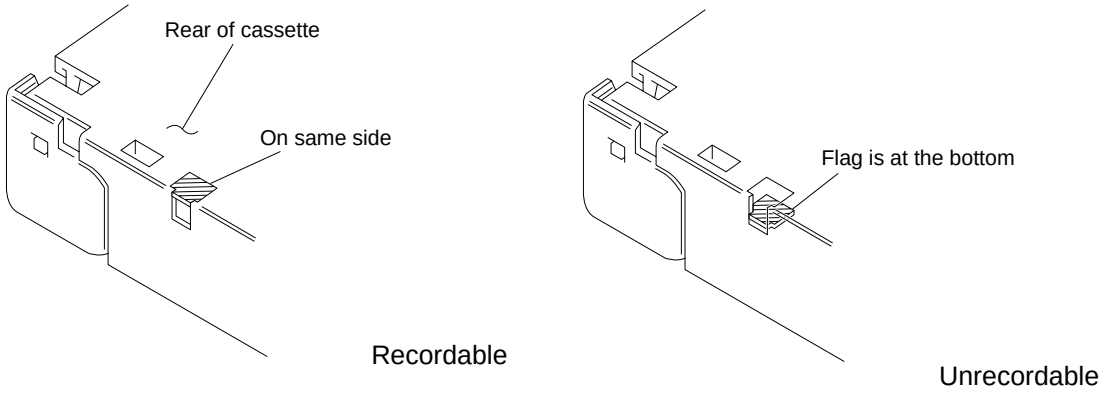


Large cassette (L cassette)



① Tape thickness detection hole
②③④ Cassette type detection tab
⑤ Cleaning cassette tape detection tab
⑥ S cassette record inhibit plug
⑦ L cassette record inhibit plug

REC Inhibit Plugs



Detection tabs

HDCAM cassette

No.	Use	With Tab (Closed Hole)	No Tab (Open Hole)
①	Tape thickness detection	Tape thickness is 13.5 μm	
⑤	Cleaning cassette tape detection	Normal cassette tape	Cleaning cassette tape
②③④	Cassette type detection	The HDCAM cassette has no tab only for ④ (Open hole), and indicates the cassette tape type according to the combination of the three hubs (See the following).	

Cassette type detection tab (○: Closed hole, ●: Open hole)

Tab State ② ④ ③	Cassette Tape Type	Remarks
○●	HDCAM	
○○	Betacam/Betacam SP	Unusable
●○	Betacam SX	Unusable
○○	Digital Betacam	Unusable
●○, ●●, ○●, ●●	Except the above	Unusable

2-12. Removing the Cassette Tape When Tape Slack Occurs

Note

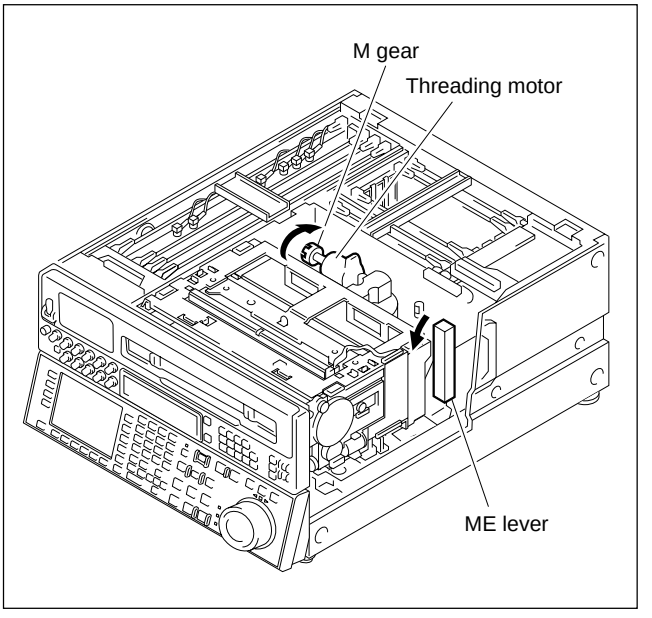
Be sure to turn off the POWER switch and unplug the power cord before starting the removal/installation.

When tape slack occurs in this unit, remove the cassette tape using the following procedure.

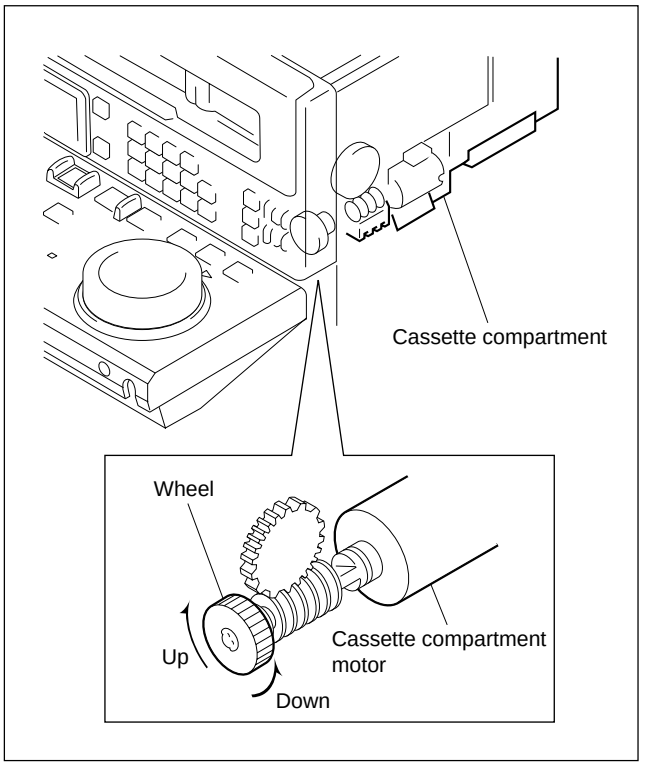
Note

Perform the procedure carefully so that the tape is not damaged.

1. Turn OFF the power switch.
2. Remove the upper lid.
   (Refer to “2-5-1. Removing/Installing the Upper Lid, Side Panels, Bottom Plate”.)
3. Remove the plate MD assembly.
   (Refer to “2-6. Removing/Installing the Plate MD Assembly”.)
4. Rotate the M gear attached to the threading motor in the arrow direction for half a round using your finger, and slacked the tape.
5. Move the ME lever to the front panel side, and rewind the tape inside the cassette.



6. Repeat steps 4 and 5 until the tape has rewound completely inside the cassette.
7. Secure the lower control panel at 90° (with the panel side facing up).
8. Rotate the wheel shown in the figure until the cassette has been ejected completely.



2-13. Fixtures and Measuring Equipments

2-13-1. Fixtures

Fig. No.	Part No.	Description	Inscription Code	For use
1	J-6001-820-A	Drum eccentricity gauge (3)	–	Inner drum eccentricity adjustment
2	J-6001-830-A	Drum eccentricity gauge (2)	–	
3	J-6001-840-A or J-6325-530-A	Drum eccentricity gauge (1) or Drum eccentricity gauge (6)	–	
4	J-6087-000-A	Drum eccentricity gauge (5)	–	
5	J-6324-030-A	Drum eccentricity gauge (7)	MW-403	
6	J-6035-070-A	Extraction tool, IC (CT-2101)	–	Extraction of IC (PLCC type)
7	J-6080-029-A	Mirror (Small round type 12 mm)	–	Cassette pillar height adjustment
8	J-6086-570-A	Flatness plate	SL-657	AT head zenith adjustment
9	J-6152-450-A	Wire clearance check gauge	–	Clearance check
10	J-6251-090-A	Torque screwdriver's bit (d=2.5 mm, l=120 mm)	–	Tightening screws to fix a drum assembly and inner drum assembly
	J-6323-440-A	Torque screwdriver's bit (d=0.89 mm, l=50 mm)	–	Tightening screws to fix a tension regulator roller
	J-6323-500-A	Torque screwdriver's bit (d=2 mm, l=75 mm)	–	Tightening screws to fix a reel FG sensor
11	J-6323-420-A	Torque screwdriver's bit (+2 mm, l=75 mm)	–	Tightening screws to fix a brush/slip ring assembly
	J-6323-430-A	Torque screwdriver's bit (+3 mm, l=90 mm)	–	Tightening screws to fix a reel motor assembly and ring roller
12	J-6252-510-A	Torque driver (6 kg・cm)	JB-5251	Tightening screws
	J-6252-520-A	Torque driver (12 kg・cm)	JB-5252	Tightening screws
13	A-8312-823-A	Extension board (L), EX-596	–	Large Plug-in board check and adjustment
14	A-8312-821-A	Extension board (S), EX-579	–	Small Plug-in board check and adjustment (CUE-10, DCP-26, EQ-85)
	A-8312-822-A	Extension board (S), EX-580	–	Small Plug-in board (For PSW-51) check and adjustment
15	J-6320-870-A	Reel motor shaft check tool	MW-087	Reel motor shaft slantness adjustment
16	J-6320-880-A	Cassette base plate (L)	MW-088	Reel table height adjustment, reel motor shaft slantness adjustment
17	J-6322-610-A	Tape guide adjustment driver	MW-261	Tape path alignment
18	J-6329-350-A	Reel table height gauge	MW-935	Reel table height adjustment
19	J-6420-320-A	Extension cable set	–	Extension of power supply unit
20	J-6510-010-A	Extension cable of SDI	–	RX-46, TX-68 board check and adjustment
21	J-6190-800-A	Tension regulator Adj. tool	BW-080	Slant guide slantness adjustment
22	A-8319-485-A	CDS-20 Ass'y	–	Update of software

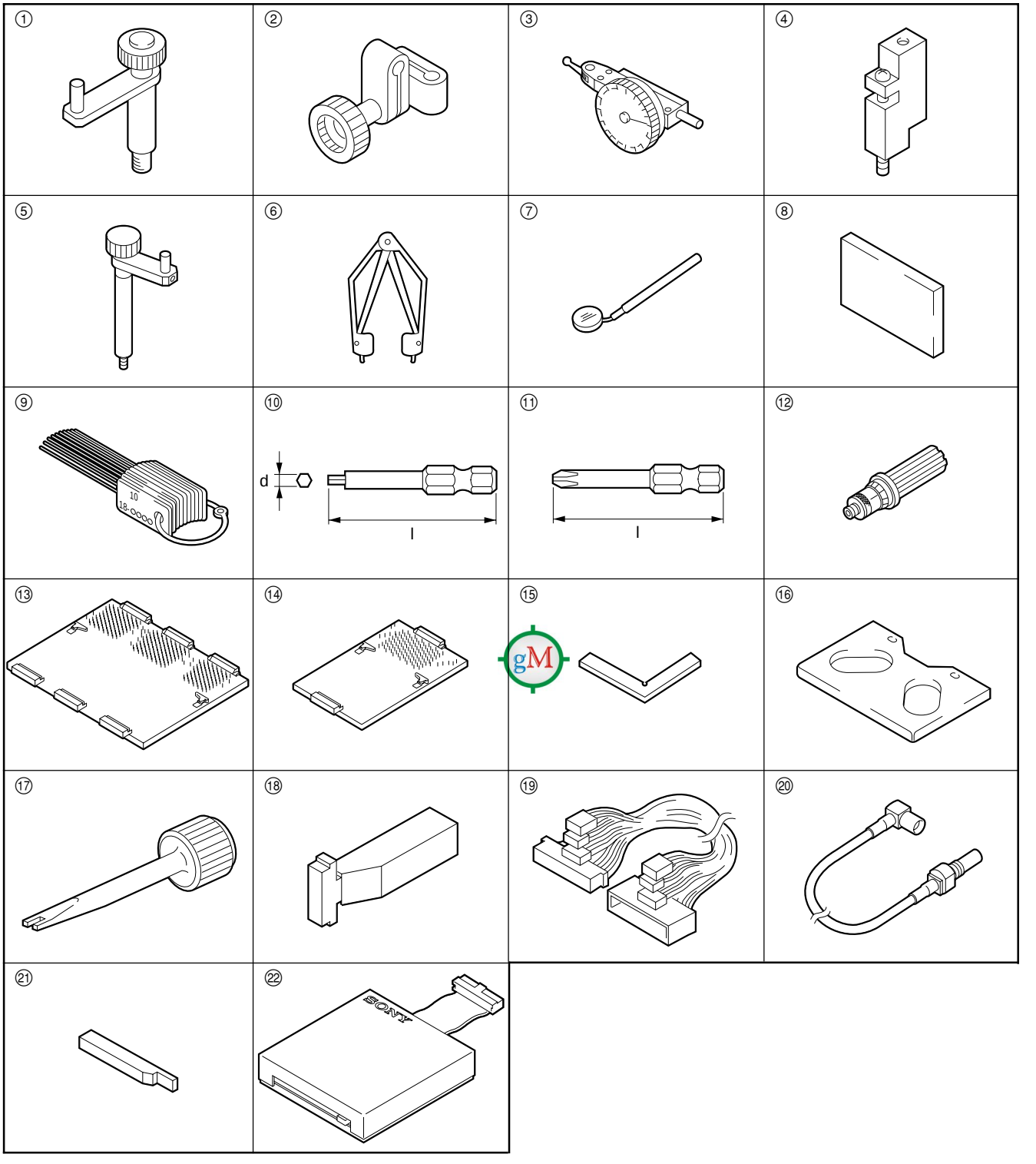

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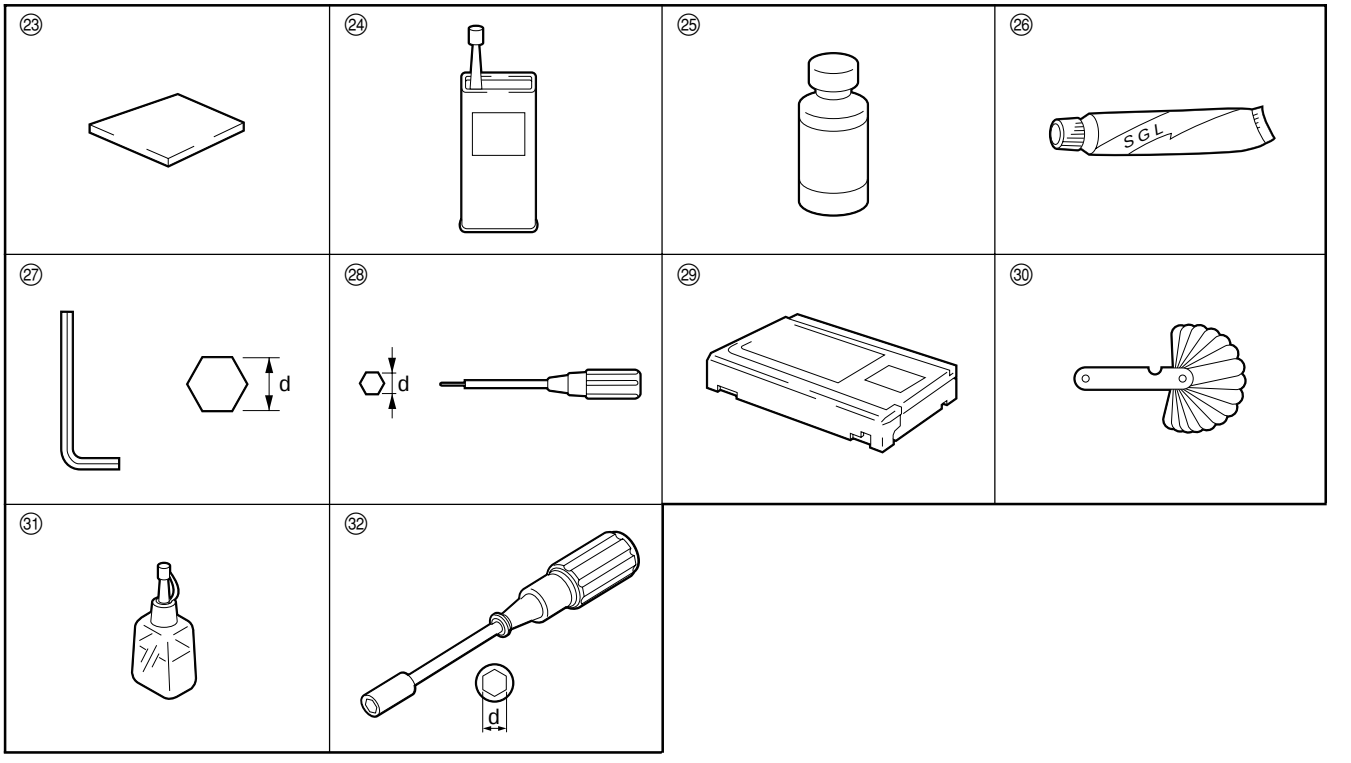
Fig. No.	Part No.	Description	Inscription Code	For use
23	3-184-527-01	Cleaning cloth (15 cm × 15 cm)	–	Cleaning
24	7-432-114-11	Locking compound 200 g	–	Prevents loosening of screw
25	7-661-018-18	Oil (Mitsubishi Diamond Oil Hydro Fluid NT-68) 50 ml	–	
26	7-651-000-10	SONY Grease (SGL-601) 50 ml	–	
27	7-700-736-01	L-shaped hexagonal wrench (d=1.27 mm)	–	
	7-700-736-03	L-shaped hexagonal wrench (d=2 mm)	–	
	7-700-736-05	L-shaped hexagonal wrench (d=1.5 mm)	–	
	7-700-736-06	L-shaped hexagonal wrench (d=0.9 mm)	–	
28	7-700-766-04	Hexagonal wrench driver (d=2.5 mm)	–	
29	8-960-076-01	Alignment tape, HR5-1A	–	Video, audio system adjustment
	8-960-076-11	Alignment tape, HR2-1A	–	Tracking adjustment
30	9-911-053-00	Thickness gauge	–	Clearance check
31	9-919-573-01	Cleaning liguid	–	Cleaning
32	7-700-000-90	Box driver (d=4 mm)	–	TX, RX board replacement/installation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2-13-2. Measuring Equipments

Use of the following equipment or their equivalents is recommended.
All are available on the market.

Note

The equipment used only in the Maintenance Manual Part 2 are also listed.

Name	Model	Remarks
Oscilloscope	SONY Tektronix 2465B	
Audio level meter	Hewlett-Packard HP3400A	
Frequency counter	Advantest TR5821AK	
Digital voltmeter	Advantest TR6845	
HD SDI signal generator	Shibasoku TG37AX, SONY Tektronix TG2000 (HDVG1, AWVG1)	
SDI DA converter	SONY PFV-D50 + HKPF-102 (59.94/60i only)	
HD SDI compatible monitor	SONY BVM-D20F1J/BVM-D14H5J or Shibasoku CM202H	
Audio oscillator	Hewlett-Packard HP3435	For analog audio adjustment, check
Waveform monitor	SONY Tektronix WFM-6011 SONY Tektronix 1730D Leader Electronics LV5152DA SONY Tektronix WFM 1125	For D1 SDI For D2 SDI, analog composite For HD SDI For HD SDI
Serial digital input compatible monitor	SONY BVM-9044QD SONY BVM-2016 + BKM-2090	For D1 signal input For D2 serial signal input

2-13-3. Alignment Tape

1. HR2-1A (For Tracking Adjustments)

Part No.: 8-960-076-11

Recording Signal Details

Time min.: sec.	CTL Track	CUE Track	Video/Audio Track	For use
00 : 00 ↑ (CTL Pulse)(*1) ↓	CTL	1 kHz 0 VU	5.875 MHz (A ch only)	• Video tracking adjustment • CTL head position adjustment • AT head height adjustment • AT head position adjustment • CUE level check • PF switching position adjustment
15 : 00		12 kHz 0 VU	A, C ch −5.875 MHz	• AT head slantness adjustment • AT head head-to-tape contact force adjustment
20 : 00			A, C ch First half: 5.875 MHz Latter half: 23.5 MHz B, D ch First half: 23.5 MHz Latter half: 5.875 MHz	
25 : 00			23.5 MHz (All ch)	
30 : 00				

(*1) : The CTL signal is recorded instead of the time code.
This section is only actuated the CTL counter, but the time code is not counted.

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2. HR5-1A (For Digital Video, Audio System Adjustments)

Part No.: 8-960-076-01

Recording Signal Details

Time min.: sec.	CTL	VIDEO	D-AUDIO	CUE	Time min.: sec.
00 : 00	CTL	Color Bars (100%)	1 kHz −20 dB FS	1 kHz 0 VU	00 : 00
					01 : 25
				Blank	01 : 30
02 : 00			1 kHz 0 dB FS	1 kHz −20 VU	
					02 : 25
				Blank	02 : 30
				3 kHz −20 VU	
					02 : 55
				Blank	03 : 00
				7 kHz −20 VU	
					03 : 25
				Blank	03 : 30
				10 kHz −20 VU	
					03 : 55
04 : 00				Blank	04 : 00
			−∞ dB FS	12 kHz −20 VU	
					04 : 25
				Blank	04 : 30
				90 Hz −20 VU	
					04 : 55
				Blank	05 : 00
				Repeat	
06 : 00			20 Hz −20 dB FS		
08 : 00			20 kHz −20 dB FS		
10 : 00		Ramp	Repeat	Repeat	10 : 00
20 : 00		Multi Burst	–	–	20 : 00
30 : 00					30 : 00

2-14. ISR

2-14-1. Outline

This unit corresponds to the ISR (Interactive Status Reporting system) function.
When this unit is connected to a personal computer which runs Sony's ISR application software, the status of this unit or the contents of errors occurred can be intensively monitored and managed on the monitor screen of the personal computer. The data displayed on the monitor screen can be stored as a file.

Note

Please contact your Sony dealer regarding the ISR application software, method of using and installing the personal computer which can be used for this software, and detailed operating methods.

The major functions of this unit are as follows.

Monitor Functions

- Error code and error message (Refer to Section 3-1.)
- Display of operation status (Equivalent to the display on the control panel of the unit.)

Management Functions

- Model name, serial No., destination
- ROM version

Displayed Item	Description
Manufacturer	Displayed as SONY
Model name	Displays the model name.
Serial number	Displays the serial No.
Device ID	Any name can be given and registered to the model name
Destination	Displays the destination J (For Japan), UC (For U.S.A. and Canada), EK (For Europe)
ROM	Displays information on the ROMs installed in this unit

- Setup data

Inspection Functions

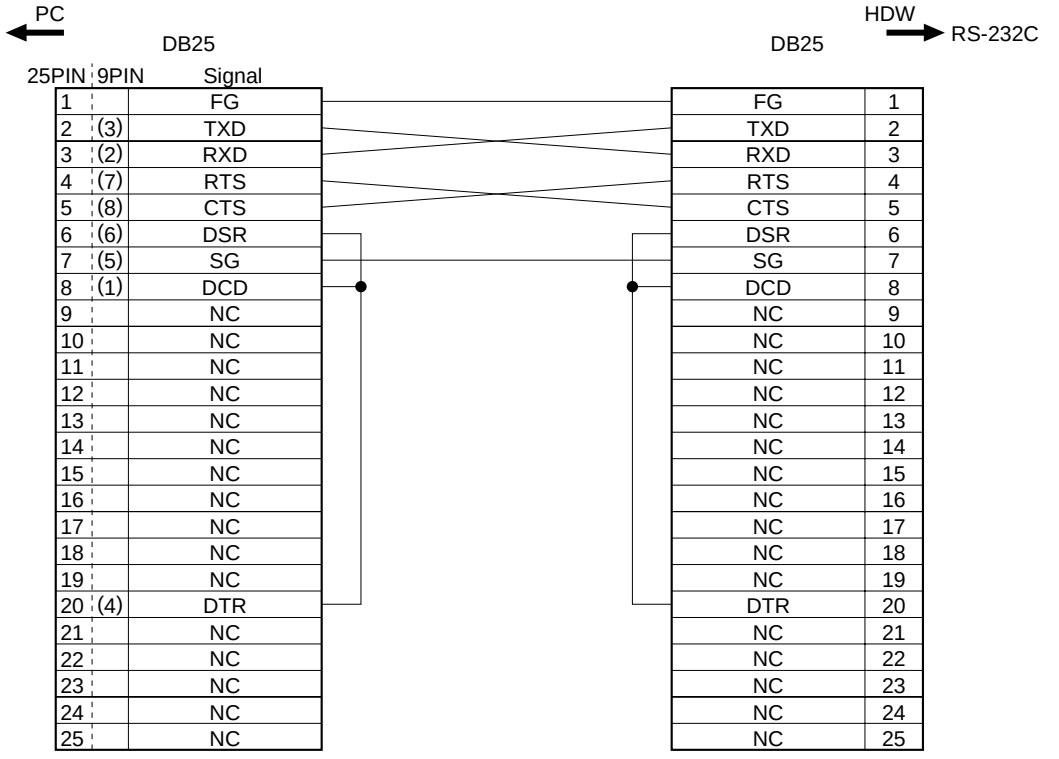
- Hours meter (Same as the hours meter of the setup menu)
- Error logger

2-14-2. Information on Communicating Cables

Prepare cables according to the following information on connection.

1. For connecting Directly to a Personal Computer

Use the RS-232C cross cable.

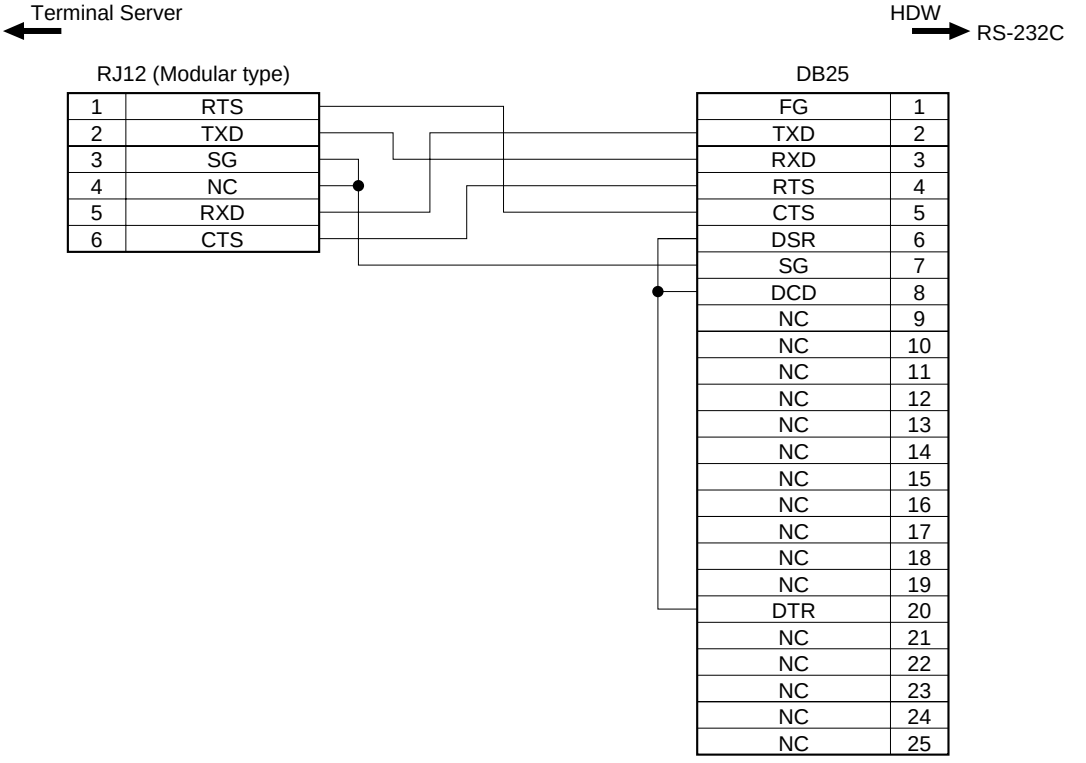


( ); Pin numbers for 9-pin type

2. For Connecting to a Personal Computer Via LAN (Terminal Server: 6-pin Port)

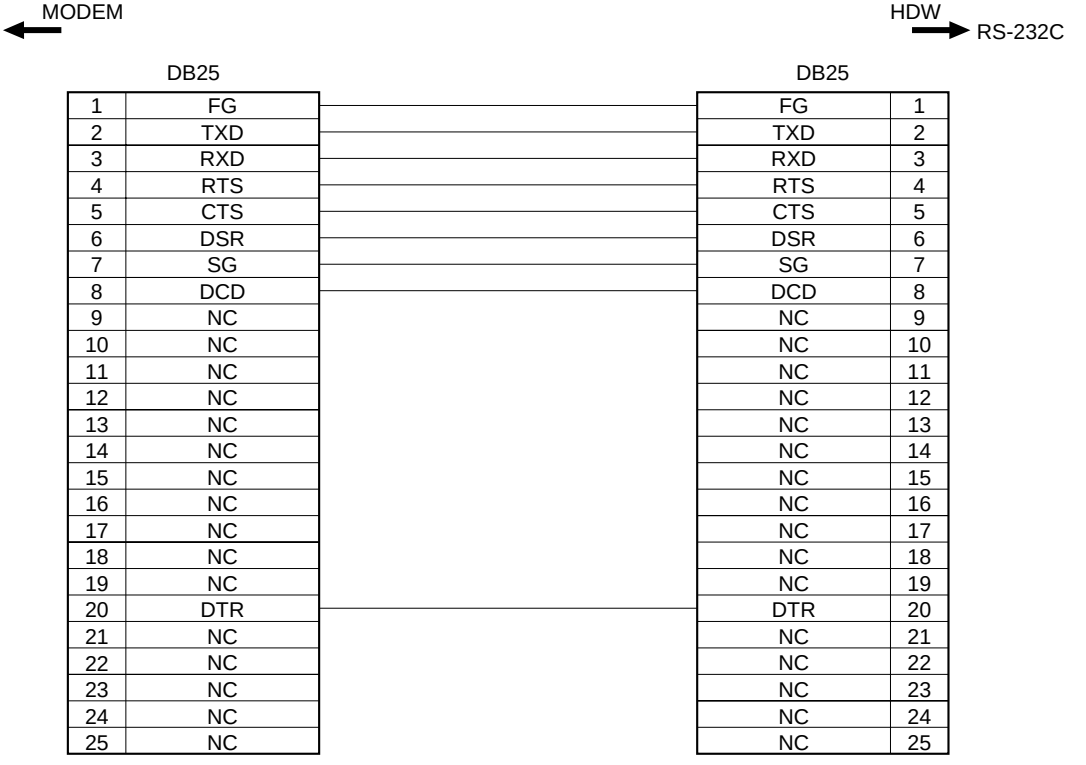
Note

The connection varies depending on the terminal server.
Be sure to check the pin assignment of the terminal server side, and follow accordingly.



3. For Connecting to a Personal Computer Via Modem

Use the RS-232C straight cable.



Section 3
Self-Diagnosis

3-1. Overview

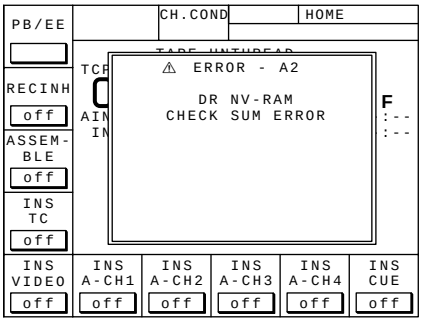
This unit is equipped a self-diagnosis function for internal errors. Following three messages are available in the self-diagnosis.
Error messages: Displays serious errors which stop the VTR.
Warning messages: Displays warnings that the VTR can be operated continuously.
Channel condition messages: Displays the channel condition errors of the video signals and the audio signals.

Note

The “protection mode” described in this section is a mode in which the servo control system automatically stops the tape running and the rotation of the drum motor to protect the tape and the mechanical parts. It also prohibits the insertion and ejection of a cassette tape.
When this mode is selected, it is impossible for the unit to return to normal operating condition except by turning the power ON again.
If the “protection mode” is selected with the cassette tape inserted, refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”, turn the power OFF, and be ensure to remove the cassette tape with your hand.
If the power is turned ON again without removing the cassette tape, the tape may be damaged.

3-2. Error Messages

When an error is detected while the unit is operating, immediately the ALARM lamp on the control panel lights up and an error message is displayed. If several error messages exist for the error, their record will be saved in the “error logger”. Be ensure to check the error logger, and correct the error accordingly.
(For details of the error logger, refer to “4-2-2. Error Logger”.)



The content of diagram are only one example of many.

Error messages

Code	Message indicated on time data display area	Page	Content
01.	REEL TROUBLE-1	3-3	Detected “tape slack” during threading or unthreading.
02.	REEL TROUBLE-2	3-4	Detected “ tape slack” during search, fast-forward or rewind.
03.	REEL TROUBLE-3	3-6	Detected “tape slack” during recording or playback.
04.	REEL TROUBLE-4	3-7	Detected abnormal speed of tape running during fast-forward or rewind.
05.	REEL TROUBLE-5	3-8	Detected abnormal operation on S-side or T-side reel during cassette compartment operation, or detected abnormal current flow in the S-side or T-side mechanism.
06.	TAPE TENSION ERROR	3-9	Detected excessive tape tension during playback or recording.
07.	CAPSTAN TROUBLE	3-10	Detected abnormal operation of capstan motor.
08.	DRUM TROUBLE	3-10	Detected abnormal operation of drum motor.
09.	TH/UNTH MOTOR TIME OUT	3-11	Detected abnormal operation during threading or unthreading.
0A.	THREADING TROUBLE	3-12	Detected incorrect ending of process for tape top when threading.
10.	DEW DETECTED	3-12	Detected dew condensation.
11.	TAPE TOP/END SENSOR TROUBLE	3-13	Detected tape top and tape end simultaneously.
12.	TAPE TOP SENSOR TROUBLE	3-13	Detected abnormal condition in tape top sensor.
13.	TAPE END SENSOR TROUBLE	3-14	Detected abnormal condition in tape end sensor.
14.	FAN MOTOR TROUBLE	3-14	Detected abnormal operation of fan motor for cooling.
20.	CASSETTE COMPART-MENT MOTOR LOCK	3-15	Detected abnormal condition during cassette compartment operation.
21.	REEL SHIFT MOTOR LOCK	3-15	Detected abnormal condition during movement of reel tables in accordance with cassette sizes.
22.	REEL POSITION SENSOR TROUBLE	3-16	Detected L cassette and S cassette positions of reel tables simultaneously.
92.	INTERNAL INTERFACE	3-17	Detected abnormal condition in communication between CPUs on circuit boards.
93.	CPU INITIALIZE ERROR	3-18	Detected abnormal condition in mutual check between CPUs at power ON.
97.	SV NV-RAM TROUBLE	3-19	Detected abnormal condition during data-read process of servo system adjustment data at power ON.
A0.	READ WRITE ERROR	3-19	Detected abnormal condition during data-write process to a RAM on SS-88 board at power ON.
A1.	SY ROM ERROR	3-20	Detected abnormal condition during data-read process from ROM in system control block at power ON.
A2.	DR NV-RAM CHECK SUM ERROR	3-20	Detected abnormal condition during read process of model data at power ON.
A3.	SYS NV-RAM CHECK SUM ERROR	3-21	Detected abnormal condition during read process of menu set up data at power ON.
A4.	PLAYER CONTROLL COMMAND BUFFER FULL	3-21	Transmission buffer of 9-pin serial communication for player control becomes full.
A5.	RS422 REMOTE COMMAND BUFFER FULL	3-22	Received buffer of 9-pin serial communication becomes full.
B0.	DT HARD ERROR	3-22	Detected abnormal condition during distortion erasure process of DT head.
B1.	TCG HARD ERROR	3-22	Hardware error in time code generator IC and its periphery.

ERROR-01 REEL TROUBLE-1

Description: Tape slacking is detected during threading or unthreading.

Sub messages and detecting conditions:

(1) Slack detected (T-REEL/THREADING)
When the relation between T reel FG and threading FG is out of the specification during threading or unthreading after tape winding diameter measurement (*1) is completed.

(2) No FG Detected (S/T REEL)
When T reel FG is not detected for a certain period of time while the S reel is stopping during threading or unthreading before tape winding diameter measurement (*1) is completed.

Possible causes:

- T reel motor defective.
- T reel motor drive circuit (DR-307 board) malfunction.
- T reel FG waveformshaping circuit (DR-307 board) malfunction.
- T reel brake defective.
- T reel brake solenoid drive circuit (DR-307 board) malfunction.
- Servo adjustment is faulty for T reel.
- Height adjustment is faulty for T reel.
- Cassette compartment defective or installation of it is faulty.
  (The reel stopped rotating because of the rising of the cassette tape from its reference position.)
- Clearance adjustment is faulty for T reel FG detection block.
- Disconnection of harness.

Protecting operations:

The protection mode is selected, and threading or unthreading operations are stopped.

Note

Be ensure to remove the cassette tape with your hand, after turning the power OFF.
If the power is turned ON again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

(*1): The state in which tape winding diameter measurement is completed meens REMAIN TIME is displayed on the control panel.
However, REMAIN TIME is not displayed even if tape winding diameter measurement is completed during threading and unthreading.

ERROR-02 REEL TROUBLE-2

Description: Tape slacking is detected during search, fast-forward or rewind.

Sub messages and detecting conditions:

(1) Direction Disagreement
When the rotating directions of the S reel and T reel do not match continuously for a certain period of time.

(2) Slack Detected (Pinch-On FWD) (S-REEL/T-REEL)
When the relation between S reel FG and T reel FG is out of the specification during search in the normal direction.

(3) Slack Detected (Pinch-On REV) (S-REEL/T-REEL)
When the relation between S reel FG and T reel FG is out of the specification during search in the reverse direction.

(4) Slack Detected (Pinch-On FWD) (CAPSTAN/T-REEL)
When the relation between capstan FG and T reel FG is out of the specification during search in the normal direction.

(5) Slack Detected (Pinch-On REV) (CAPSTAN/S-REEL)
When the relation between capstan FG and S reel FG is out of the specification during search in the reverse direction.

(6) Slack Detected (Pinch-Off FWD) (S-REEL/T-REEL)
When the relation between S reel FG and T reel FG is out of the specification during fast-foward.

(7) Slack Detected (Pinch-Off REV) (S-REEL/T-REEL)
When the relation between S reel FG and T reel FG is out of the specification during rewind.

(8) No FG Detected (S-REEL)
When the specified S reel FG amount is not detected for the T side tape feeding amount.

(9) No FG Detected (T-REEL)
When the specified T reel FG amount is not detected for the S side tape feeding amount.

(10) No FG Detected (S/T-REEL)
When the specified S reel FG and T reel FG are not detected.

Possible causes:

- S side or T side reel motor defective.
- S side or T side reel motor drive circuit (DR-307 board) malfunction.
- S side or T side FG waveform shaping circuit (DR-307 board) malfunction.
- Capstan motor defective.
- Capstan motor drive circuit (DR-307 board) malfunction.
- Capstan FG waveform shaping circuit (DR-307 board) malfunction.
- S side or T side reel brake defective.
- S side or T side reel brake solenoid drive circuit (DR-307 board) malfunction.
- Servo adjustment is faulty for reel, capstan or S side tension sensors.
- Height adjustment is faulty for reel table.
- Cassette compartment defective or installation of it is faulty.
  (The reel stopped rotating because of the rising of the cassette tape from its reference position.)
- Clearance adjustment is faulty for S side or T side reel FG detection block.
- Winding torque problem during rewind because of malfunction of the S tension sensor or tension detection circuit (DR-307 board).
- Trouble of tape path, drum and the same.
- Tape trouble (problem of rewind state).
- Disconnection of harness.

Protecting operations:

The protection mode is selected, and search, fast-forward or rewind operations are stopped.

Note

Be ensure to remove the cassette tape with your hand, after turning the power OFF.
If the power is turned ON again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

ERROR-03 REEL TROUBLE-3

Description: Tape slacking is detected during recording or playback.

Sub messages and detecting conditions:

(1) Direction Disagreement
When the rotating directions of the S reel and T reel do not match continuously for a certain period of time.

(2) Slack Detected (S-REEL/T-REEL)
When the relation between S reel FG and T reel FG is out of the specification.

(3) Slack Detected (CAPSTAN/T-REEL)
When the relation between capstan FG and T reel FG is out of the specification.

(4) Slack Detected (CAPSTAN/S-REEL)
When the relation between capstan FG and S reel FG is out of the specification.

(5) Low tension Detected
When the tension value calculated from the S side tension sensor output is less than the specified value continuously for a certain period of time.

Possible causes:

- S side or T side reel motor defective.
- S side or T side reel motor drive circuit (DR-307 board) malfunction.
- S side or T side reel FG waveform shaping circuit (DR-307 board) malfunction.
- Capstan motor defective.
- Capstan motor drive circuit (DR-307 board) malfunction.
- Capstan FG waveform shaping circuit (DR-307 board) malfunction.
- S side or T side reel brake defective.
- S side or T side reel brake solenoid drive circuit (DR-307 board) malfunction.
- Servo adjustment is faulty for reel, capstan or S side tension sensors.
- Height adjustment is faulty for reel table.
- Cassette compartment defective or installation of it is faulty.
  (The reel stopped rotating because of the rising of the cassette tape from its reference position.)
- Clearance adjustment is faulty for S side or T side reel FG detection block.
- Malfunction of S side tension sensor or tension detection circuit (DR-307 board)
- Trouble of tape path, drum and the same.
- Tape trouble (problem of rewind state).
- Disconnection of harness.

Protecting operations:

The protection mode is selected, and recording and playback operations are stopped.

Note

Be ensure to remove the cassette tape with your hand, after turning off the power.
If the power is turned ON again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

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ERROR-04 REEL TROUBLE-4

Description: Abnormal speed of tape running is detected during fast-forward or rewind.

Sub messages and detecting conditions:

(1) S-REEL Side Trouble (FF)
When the tape running speed is insufficient with respect to the target speed continuously for a certain period of time, and the S side tension is above the specified value during forward. (The cause should be at the S reel side.)

(2) T-REEL Side Trouble (FF)
When the tape running speed is insufficient with respect to the target speed continuously for a certain period of time, and the S side tension is below the specified value during forward. (The cause should be at the T reel side.)

(3) S-REEL Side Trouble (REW)
When the tape running speed is insufficient with respect to the target speed continuously for a certain period of time, and the S side tension is below the specified value during rewind. (The cause should be at the S reel side.)

(4) T-REEL Side Trouble (REW)
When the tape running speed is insufficient with respect to the target speed continuously for a certain period of time, and the S side tension is above the specified value during fast-forward. (The cause should be at the T reel side.)

Possible causes:

- S side or T side reel motor defective.
- S side or T side reel motor drive circuit (DR-307 board) malfunction.
- S side or T side reel FG waveform shaping circuit (DR-307 board) malfunction.
- S side or T side reel brake defective.
- S side or T side reel brake solenoid drive circuit (DR-307 board) malfunction.
- Servo adjustment is faulty for reel.
- Height adjustment is faulty for reel table.
- Cassette compartment defective or installation of it is faulty.
  (The reel stopped rotating because of the rising of the cassette tape from its reference position.)
- Clearance adjustment is faulty for S side or T side FG detection block.
- Trouble of tape path, drum and the same.
- Tape trouble (problem of winding state).
- Disconnection of harness.

Protection operations:

The fast-forward or rewind operations are stopped. Thereafter only ejection of cassette tape is operated.
After cassette tape ejection, insertion of the cassette tape is prohibited.

ERROR-05 REEL TROUBLE-5

Description: Abnormal operations on the S side reel or T side reel are detected in the diagnosis (*1) during cassette tape insertion. Or continuous abnormal current flow to the S reel or T reel was detected.

Sub messages and detecting conditions:

(1) S-REEL FG Trouble Detected
When the S reel FG count is above the specified value when both S and T side reels should be stopping.

(2) T-REEL FG Trouble Detected
When the T reel FG count is above the specified value when both S and T side reels should be stopping.

(3) No FG Detected (S-REEL)
When the S reel FG count is below the specified value when the S side reel should be rotating.

(4) No FG Detected (T-REEL)
When the T reel FG count is below the specified value when the T side reel should be rotating.

(5) Over Current Detected (S-REEL)
When a current above the specified value flows to the S side reel for more than the specified period of time.

(6) Over Current Detected (T-REEL)
When a current above the specified value flows to the T side reel for more than the specified period of time.

Possible causes:

- S side or T side reel motor defective.
- S side or T side reel motor drive circuit (DR-307 board) malfunction.
- S side or T side FG waveform shaping circuit (DR-307 board) malfunction.
- S side or T side reel brake malfunction.
- S side or T side reel brake solenoid drive circuit (DR-307 board) malfunction.
- Servo adjustment is faulty for reel.
- Height adjustment is faulty for reel table.
- Cassette compartment defective or installation of it is faulty.
  (The reel stopped rotating because of the rising of the cassette tape from its reference position.)
- Clearance adjustment is faulty for S side or T side reel FG detection block.
- S side or T side reel FG sensor (SE-344 board) malfunction.
- Disconnection of harness.

Protecting operations:

For detecting conditions (1), (2), (3), or (4), the cassette tape is ejected. Thereafter insertion of the cassette tape is prohibited.
For detecting conditions (5) and (6), if the cassette compartment is operating, the cassette tape is ejected. Thereafter, insertion of the cassette tape is prohibited.
For other conditions, the protection mode is selected and operations are stopped.

Note

If the cassette tape is not ejected, be ensure to turn the power OFF and remove the tape with your hand.
If the power is turned ON again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

(∗1): Before running the tape, the unit determines if the reel system is operating normally beforehand.

ERROR-06 TAPE TENSION ERROR

Description: Excessive tape tension is detected during recording or playback.

Detecting condition:

When the tension value calculated from the S side tension sensor output is above the specified value continuously for a certain period of time.

Possible causes:

- S side reel motor defective.
- S side reel motor drive circuit (DR-307 board) malfunction.
- S side reel brake defective.
- S side reel brake solenoid drive circuit (DR-307 board) malfunction.
- Servo adjustment is faulty for S side reel or S side tension sensor.
- Height adjustment is faulty for reel table.
- Cassette compartment defective or installation of it is faulty.
  (The reel stopped rotating because of the rising of the cassette tape from its reference position.)
- Defective of S side tension sensor or malfunction of tension detection circuit (DR-307 board).
- Disconnection of harness.

Protecting operations:

The recording or playback operations are stopped. Thereafter only ejection of cassette tape is operated.
After cassette tape ejection, insertion of the cassette tape is prohibited.

ERROR-07 CAPSTAN TROUBLE

Description: Abnormal operations of the capstan motor are detected.

Sub messages and detecting conditions:

(1) Speed Error Detected
When the tape speed calculated from the capstan FG with respect to the target speed is out of the specification during recording, playback, or search.

(2) No FG Detected
The capstan FG is not detected within the specified time during recording or playback.

(3) Trouble Detected When cassette up/down operation
When the capstan FG count is less than the specified value in the diagnosis during cassette insertion.

Possible cause:

Defective of the capstan motor (including the FG sensor).

Protecting operations:

For detecting conditions (1) or (2), the cassette tape is ejected. Thereafter insertion of the cassette tape is prohibited.
For detecting condition (3), the cassette tape is ejected.
After ejection of the cassette tape, insertion of the cassette tape is prohibited.

ERROR-08 DRUM TROUBLE

Description: Abnormal operations of the drum motor are detected.

Sub messages and detecting conditions:

(1) Speed Error Detected
When the tape speed calculated from the drum FG with respect to the target speed is out of the specification continuously for a certain period of time.

(2) No PG Detected
When the drum FG signal is not detected within the specified time during drum motor rotation.

(3) No FG Detected
When the drum FG signal is not detected within the specified time during drum motor rotation.

Possible causes:

- Drum motor defective.
- Drum PG motor drive circuit (DR-307 board) malfunction.
- Drum defective or drum FG waveform shaping circuit (DR-307 board) malfunction.

Protecting operations:

Tape running is stopped and rotation of the drum motor is stopped. Thereafter only ejection of cassette is operated. However, the drum motor does not rotate during cassette tape ejection.
After cassette tape ejection, insertion of the cassette tape is prohibited.

ERROR-09 TH/UNTH MOTOR TIME OUT

Description: Abnormal operation is detected during threading or unthreading.

Sub messages and detecting conditions:

(1) No FG Detected
When the threading FG is not detected within the specified time during threading motor drives.

(2) Time Over
When threading and unthreading did not end within the specified time.

(3) Unthread end not sensed
When unthreading end is not detected within the specified time during cassette tape is not loaded.

Possible causes:

- Threading motor defective.
- Threading motor drive circuit (DR-307 board) malfunction.
- Threading FG waveform shaping circuit (DR-307 board) malfunction.
- Threading FG sensor (PTC-54 board) defective.
- Threading end sensor (TR-79 board) defective.
- Unthreading end sensor (TR-79 board) defective.
- Threading mechanism trouble.

Protecting operations:

For detecting condition (1) or (2), the protection mode is selected, and threading or unthreading operations are stopped.
For detecting condition (3), the cassette tape insertion is prohibited.

Note

If the cassette tape is not ejected, be ensure to remove the cassette tape with your hand, after turning the power OFF.
If the power is turned ON again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

ERROR-0A THREADING TROUBLE

Description: The incorrect ending of process for tape top when threading is detected.

Detecting condition:

When tape top is detected again when threading after tape top processing.

Possible causes:

- T reel motor defective.
- T reel motor drive circuit (DR-307 board) malfunction.
- Servo adjustment is faulty for T reel.
- Tape top sensor defective.
- Tape top detection circuit (DR-307 board) malfunction.
- Tape trouble.

Protecting operation:

The cassette tape is ejected, and thereafter cassette tape insertion is prohibited.

(∗1): Tape top processing means that the process of unthreading the tape once and fast-forwarding the tape slightly without pulling out the tape from the cassette, when tape top is detected during threading.

ERROR-10 DEW DETECTED

Description: Condensation is detected.

Detecting condition:

When condensation is detected continuously for the specified time.

Possible causes:

- Condensation (When the using environment changes from low temperature to high temperature suddenly, etc.)
- Condensation sensor defect.

Protecting operations:

During search, fast-forward, or rewind, operation is stopped, and the cassette tape is ejected.
Operations are continued during recording or playback.
During drum motor rotations other than the above operations, the cassette tape is ejected.
When the drum motor is stopped, operations are continued. Operations of the rotary head cleaner are prohibited.
After the cassette tape is ejected, cassette tape insertion is prohibited while this message is displayed.
When the specified time passes after the condensation is not detected, this message is automatically cleared.

Note

When this message is displayed because of the condensation, do not turn the power OFF until this message is cleared.
If the power is turned ON while this message is displayed and the unit is used, the tape may be damaged.

ERROR-11 TAPE TOP/END SENSOR TROUBLE

Description: Tape top and tape end are detected simultaneously.

Detecting condition:

When both tape top and tape end are simultaneously detected for the specified time.

Possible causes:

- Tape top sensor or tape end sensor defective.
- Tape top or tape end detection circuit (DR-307 board) malfunction.
- Harness disconnection.

Protecting operations:

Operations are stopped. Thereafter only ejection of cassette tape is operated.
After ejection of the cassette tape, cassette tape insertion is prohibited.

ERROR-12 TAPE TOP SENSOR TROUBLE

Description: Abnormal condition in the tape top sensor was detected.

Detecting condition:

When tape top is detected continuously for the specified time.

Possible causes:

- Tape top sensor defective.
- Tape top detection circuit (DR-307 board) malfunction.
- Harness disconnection.
- The tape is actually at the tape top position because the troubles other than the tape sensor.

Protecting operations:

When the tape is running in the normal direction, operations are continued until tape end is detected. When tape end is detected, the tape is rewound slightly, and tape running is stopped.
When the tape is running other than the above, tape running is stopped.
After stopping the tape running, only ejection of cassette tape is operated. After ejection of the cassette tape, cassette tape insertion is prohibited.

ERROR-13 TAPE END SENSOR TROUBLE

Description: Abnormal condition in the tape end sensor is detected.

Detecting condition:

When tape end is detected continuously for a specified time.

Possible causes:

- Tape end sensor defective.
- Tape end detection circuit (DR-307 board) malfunction.
- Harness disconnection.
- The tape is actually at the tape end position due to problems other than the tape sensor.

Protecting operations:

When the tape is running in the reverse direction, operations are continued until tape top is detected. When tape top is detected, the tape is rewound slightly, and tape running is stopped.
When the tape is running other than the above, tape running is stopped.
After stopping the cassette tape, only ejection of cassette tape is operated. After the cassette tape is ejected, cassette tape insertion is prohibited.

ERROR-14 FAN MOTOR TROUBLE

Description: Abnormal operation of fan motor for cooling is detected.

Sub messages and detecting conditions:

(1) FAN1 Trouble Detected
When the state in which the fan motor for the power unit is not rotating is detected continuously for a specified time.

(2) FAN2 Trouble Detected
When the state in which the rear fan motor for cooling of board is not rotating is detected continuously for a specified time.

(3) FAN3 Trouble Detected
When the state in which the front fan motor for cooling of board is not rotating is detected continuously for the specified time.

Possible causes:

- Fan motor defective or fan motor stop by presence of foreign particles.
- Power supply unit malfunction.
- Harness disconnection.
- Fan motor rotation detection circuit (SS-88 board) defective.

Protecting operation:

None.

CAUTION

When this message is displayed, stop using the unit promptly and turn the power OFF. Continuing use with the fan stopped will cause the temperature inside the unit to rise, and lead to malfunctions and fire hazards.

ERROR-20 CASSETTE COMPARTMENT MOTOR LOCK

Description: Abnormal condition during cassette compartment operations is detected.

Detecting condition:

When operations are not completed even after a specified time from the start of cassette compartment operations.

Possible causes:

- Cassette compartment unit defective.
- Cassette compartment motor drive circuit (DR-307 board) malfunction.
- Cassette down sensor (CL-29 board) defective.
- Harness disconnection.

Protecting operations:

The operations of the cassette compartment are stopped. Thereafter only ejection of cassette tape is operated.
However the cassette tape may not be ejected in some cases even if instructions to eject the cassette tape are given.

Note

If the cassette tape is not ejected, be ensure to remove the cassette tape with your hand after turning the power OFF.
If the power is turned ON again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

ERROR-21 REEL SHIFT MOTOR LOCK

Description: Abnormal condition during movement of the reel tables in accordance with the cassette sizes was detected.

Detecting condition:

When operations are not completed even after a specified time from the start of reel table operations.

Possible causes:

- Reel shift mechanism defective.
- Reel shift motor defective.
- Reel shift motor drive circuit (DR-307 board) malfunction.
- S position sensor or L position sensor (PTC-71 board) defective.

Protecting operations:

The operations of the reel table are stopped, and the cassette tape is ejected.
After the cassette tape is ejected, cassette tape insertion is prohibited.

ERROR-22 REEL POSITION SENSOR TROUBLE

Description: L cassette position and S cassette position of the reel table are detected simultaneously.

Detecting condition:

When the reel table position detection sensor is detected simultaneously the L cassette position and S cassette position.

Possible causes:

- S position sensor (PTC-71 board) defective.
- L position sensor (PTC-71 board) defective.

Protecting operations:

If a cassette tape is inserted, the operations of the reel table will be stopped and the cassette tape will be ejected.
However the cassette tape may not be ejected in some cases.

Note

If the cassette tape is not ejected, be ensure to remove the cassette tape with your hand after turning the power OFF.
If power is turned ON the power again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

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ERROR-92 INTERNAL INTERFACE

Description: Abnormal condition in the communication between CPUs on the circuit boards is detected.

Sub messages and detecting conditions:

(1) FP
When communication error between SYS2 CPU (IC404/SS-88 board) and FP CPU (IC7/FP-103 board) is detected.

(2) EQ
When communication error between SYS2 CPU (IC404/SS-88 board) and EQ CPU (IC900/EQ-85 board) is detected.

(3) SV1
When communication error between SYS2 CPU (IC404/SS-88 board) and SV1 CPU (IC1005/SS-88 board) is detected.

(4) IF
When communication error between SYS2 CPU (IC404/SS-88 board) and IF CPU (IC106/SS-88 board) is detected.

(5) SV2
When communication error between SV1 CPU (IC1005/SS-88 board) and SV2 CPU (IC1024/SS-88 board) is detected.

(6) DT
When communication error between SV1 CPU (IC1005/SS-88 board) and DT CPU (IC2104/SS-88 board) is detected.

(7) DR
When communication error between SV1 CPU (IC1005/SS-88 board) and DR CPU (IC106/DR-307 board) is detected.

Possible causes:

- Corresponding CPU and peripheral circuit malfunction.
- The corresponding board is not properly attached.
- Harness disconnection.
- Contact fault and incorrect attachment when parts of the corresponding board are replaced (Detachable CPU, ROM and the same).
- Malfunction of serial communication IC (IC603, IC604 or 605/SS-88 board). (For detecting conditions: (1), (2) and (3))

Protecting operation:

For detecting condition (4) only, the protection mode is selected, and recording or playback is stopped.

Note

Be ensure to remove the cassette tape with your hand, after turning the power OFF.
If turning the power ON again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

ERROR-93 CPU INITIALIZE ERROR

Description: Abnormal condition in the mutual check between CPUs is detected at the power ON.

Sub messages and detecting conditions:

(1) DT
When the SV1 CPU (IC1005/SS-88 board) is detected an error of DT CPU (IC2104/SS-88 board).

(2) DR
When the SV1 CPU (IC1005/SS-88 board) is detected an error of DR CPU (IC106/DR-307 board).

(3) SV1
When the SYS2 CPU (IC404/SS-88 board) is detected an error of SV1 CPU (IC1005/SS-88 board).

(4) IF
When the SYS2 CPU (IC404/SS-88 board) is detected an error of IF CPU (IC106/SS-88 board).

Possible causes:

- Corresponding CPU and peripheral circuit malfunction.
- The corresponding board is not properly attached.
- Malfunction of DPRAM between CPUs. (For detecting condition (1): IC2113 or 2115/SS-88 board, detecting condition (3): IC302/SS-88 board and detecting condition (4): IC301/SS-88 board)
- For detecting condition (1), the DT adjustment data is not initialized after the replacement of the DR-307 board.
- Malfunction of DR-307 board or data nonconformity is occurred because of cut of power while saving the adjustment data.

Protecting operation:

None.

Note

Be ensure to remove the cassette tape with your hand, after turning the power OFF.
If turning the power ON again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

ERROR-97 SV NV-RAM TROUBLE

Description: Abnormal condition during the data-read process of the servo adjustment is detected at power ON.

Detecting condition:

When the checksum of the servo adjustment data does not match the read value.

Possible causes:

- Malfunction of the NV-RAM (IC30/DR-307 board) for servo.
- Harness disconnection.
- The SS-88 board is not attached properly.
- Data nonconformity is occurred because of cut of power while saving the adjustment data.

Protecting operation:

None.

Note

If the cassette tape is not ejected, be ensure to remove the cassette tape with your hand after turning the power OFF.
If turning the power ON again without removing the cassette tape, the tape may be damaged.
(Refer to “2-12. Removing the Cassette Tape When Tape Slack Occurs”.)

ERROR-A0 READ WRITE ERROR

Description: Abnormal condition during data-write process to a RAM on the SS-88 board is detected at power ON.

Sub messages and detecting conditions:

(1) MAIN SRAM2
When error in writing to the SRAM (IC416, IC417, IC418 or IC419/SS-88 board) in the system control block is detected.

(2) MAIN-IF DPRAM
When error in writing in the dual port RAM (IC301/SS-88 board) between SYS2 CPU (IC404/SS-88 board) and IF CPU (IC106/SS-88 board) is detected.

(3) MAIN-SV DPRAM
When error in writing in the dual port RAM (IC302/SS-88 board) between SYS2 CPU (IC404/SS-88 board) and SV1 CPU (IC1005/SS-88 board) is detected.

Possible causes:

- Malfunction of corresponding CPU or RAM.
- Contact fault or incorrect attachment when parts of the corresponding board are replaced (Detachable CPU, ROM and the same).

Protecting operation:

None.

ERROR-A1 SY ROM ERROR

Description: Abnormal condition during data-read process from the ROM in the system control block is detected at power ON.

Detecting condition:

When the checksum of the ROM (IC411, IC412/SS-88 board) in the system control block does not match the read value.

Possible causes:

- Faulty connection to the IC socket.
- Damage of ROM data.

Protecting operation:

None.

ERROR-A2 DR NV-RAM CHECK SUM ERROR

Description: Abnormal condition during read process of model data is detected at power ON.

Detecting condition:

When the checksum of the model data area does not match the value read.

Possible causes:

- Data is nonconformity occurred because of cut of power while updating data.
- Malfunction of NV-RAM (IC30/DR-307 board) or data damage.
- Harness disconnection.
- The model data is not initialized after the DR-307 board is replaced.

Protecting condition:

None.

Note

When this message is displayed, it may not be possible to start the unit properly because the model settings are damaged.
If used continuously, incorrect recording or incorrect operations may occur. Please contact to your local Sony's sale/service office.

ERROR-A3 SYS NV-RAM CHECK SUM ERROR

Description: Detected abnormal condition during read process of menu set up data is detected at power ON.

Detecting condition:

When the checksum of the menu data saved in the NV-RAM does not match the value read.

Possible causes:

- Data nonconformity is occurred because of cut of power while updating menu data.
- Battery of the NV-RAM (IC414/SS-88 board) in the system control block has worn out or is mounted incorrectly.
- Malfunction of the NV-RAM (IC414/SS-88 board) in the system control block or data damage.

Protecting condition:

All menu data is changed to the default.

Note

For the menu data may be damaged, the data is changed to the default.
After correcting the problem, select the menu contents again according to use before beginning use of the unit.

ERROR-A4 PLAYER CONTROL COMMAND BUFFER FULL

Description: Transmission buffer of the 9-pin serial communication for player control becomes full.

Detecting condition:

Monitoring of read and write address.

Possible causes:

- When communication which exceeds the processing ability is carried out.
- Fault of 9-pin serial communication hardware on the SS-88 board.

Protecting operation:

None.

ERROR-A5 RS422 REMOTE COMMAND BUFFER FULL

Description: Received buffer of 9-pin serial communication becomes full.

Detecting condition:

Monitoring of read and write address.

Possible causes:

- When communication which exceeds the processing ability is carried out.
- Fault of 9-pin serial communication hardware on the SS-88 board.

Protecting operation:

None.

ERROR-B0 DT HARD ERROR

Description: Abnormal condition is detected during distortion erasure process of DT head.

Detecting condition:

When the optimum value is out of the specification or is not be found in the adjustments during distortion erasure process of DT head.

Possible causes:

- Strain gauge signal detection system trouble (Advance head, DR-205A board, slip ring, HN-266 board, MB-863 board and SS-88 board).
- DT drive system trouble (SS-88 board, MB-863 board, harness, DT-34 board (drive system only), HN-266 board, slip ring, DR-205A board and advance head).

Protecting operation:

None.

ERROR-B1 TCG HARD ERROR

Description: Hardware error in time code generator IC and its periphery.

Detecting condition:

When the TCG is not operated in the free-running mode.

Possible causes:

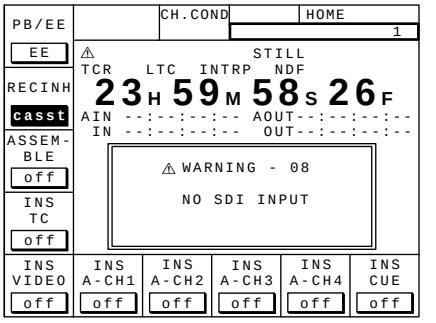
- Fault of TCG IC (IC311/SS-88 board).
- Fault of reference input.

Protecting operation:

None.

3-3. Warning Messages

The unit will be continued operating normally when these warning messages are displayed. The record of the warning messages are saved in the “error logger”. Be therefore ensure to check the error logger, and correct the error accordingly.
(For details of the error logger, refer to “4-2-2. Error Logger”.)



The content of diagram are only one example of many.

Note

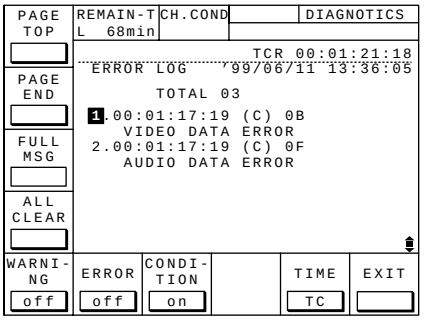
On the HOME, TC, PF1 or PF2 menu, whether or not to display the warning messages will be selected. At shipping from factory, selection of warning messages are selected to ON.
(For details, refer to the operation manual.)

Warning messages

Code	Message indicated on time data display area	Content
01.	NO EXTERNAL REFERENCE	No reference signal is input to the selected REF input connector. The unit is now operated on the internal reference signal.
02.	LOST LOCK	Capstan servo is stepped out of locking during playback, recording or editing operation.
08.	NO SDI INPUT	No serial digital input signal is detected.
09.	NO SDI AUDIO INPUT	No audio data in the serial digital input signal is detected.
10.	VITC NOT READ	Correct reading of VITC signal on the tape is impossible.
11.	AUDIO PLL UNLOCKED	PLL of the audio clock generator does not lock to the video reference signal.
14.	NO PB RF SIGNAL	PB head is not read the digital data on the tape.
15.	INCONSISTENT EMPHASIS	Emphasis information for the tape playback is inconsistent with the emphasis condition of system. **Note** Select the menu again or check the tape as required.
1C.	NO DA1/DA2 INPUT	No carrier signal is not detected at the inputs of DA1/DA2 channels.
20.	NO DA3/DA4 INPUT	No carrier signal is not detected at the inputs of DA3/DA4 channels.
2D.	INVALID SDI DATA	Data of the serial digital input signal is invalid.
34.	NO CASSETTE COMPARTMENT MODE	The cassette compartment is not installed.
3B.	NO LTC REPRODUCED	No LTC signal is recorded on the tape.
45.	DT UNLOCKED	The DT is not traced during playback.
50.	PROCESSOR IS IN TEST MODE	The processor is in test mode.
55.	VIDEO PLL UNLOCKED	PLL of the video clock generator does not lock to the video reference signal.
59.	INPUT AUDIO DATA MISMATCH 32.0 K	Sampling frequency of the digital audio input signal is different from 48 kHz.
5A.	INPUT AUDIO DATA MISMATCH 44.1 K	Sampling frequency of the digital audio input signal is different from 48 kHz.

3-4. Channel Condition Messages

When the red indicator for CHANNEL CONDITION on the control panel lights, and “CH.COND” of the display is GREEN not RED, it means that the playback signal is weakening. The record of the channel condition is saved in the “error logger”. Be ensure to check the error logger, and correct the error accordingly.
(For details of the error logger, refer to “4-2-2. Error Logger”.)



The content of diagram are only one example of many.

Channel condition messages

Code	Message indicated on time data display area	Content
1.	VIDEO DATA ERROR	Detected degradation in the video playback signal.
2.	AUDIO DATA ERROR	Detected degradation in the audio playback signal.

3-5. Error Logger Function

The error logger is a function which is detected the errors and warnings in the system during incorrect operations of the unit and are indicated the saved messages.
For details, refer to “4-2-2. Error Logger”.

Section 4
Maintenance Mode

4-1. Maintenance Mode

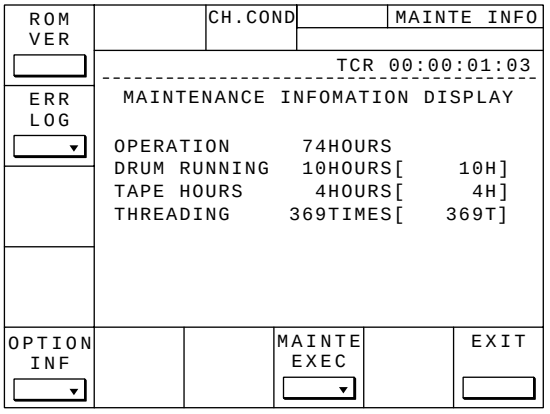
4-1-1. Overview

The unit is equipped with maintenance mode necessary in maintenance of the unit and in diagnostics of unit troubles.
Following menus and modes are available in maintenance mode.

Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

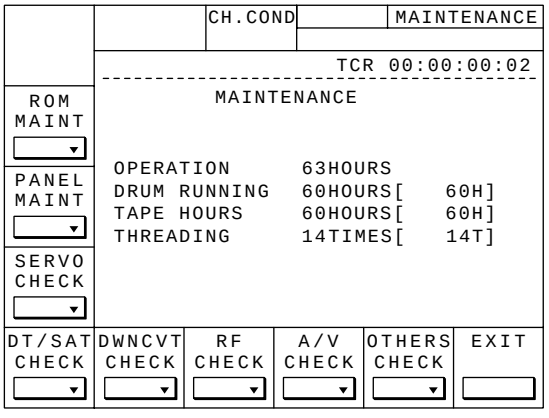
MAINTENANCE INFORMATION DISPLAY menu

F1 : ROM VERSION/SERIAL No.
F2 : ERROR LOGGER
F5 : OPTION INFORMATION



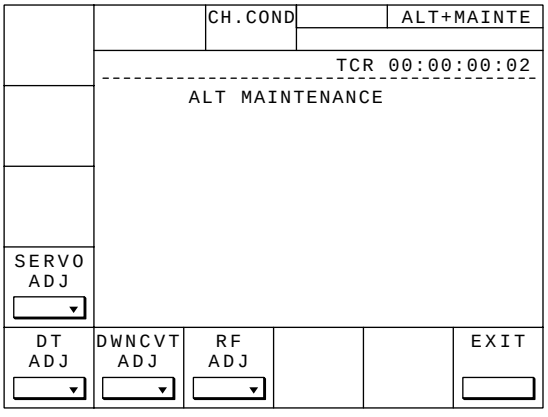
MAINTENANCE menu

F2 : ROM MAINTENANCE
F3 : PANEL MAINTENANCE
F4 : SERVO CHECK
F5 : DT/SAT CHECK
F6 : DOWN CONVERTER CHECK
F7 : RF CHECK
F8 : AUDIO/VIDEO CHECK
F9 : OTHERS CHECK



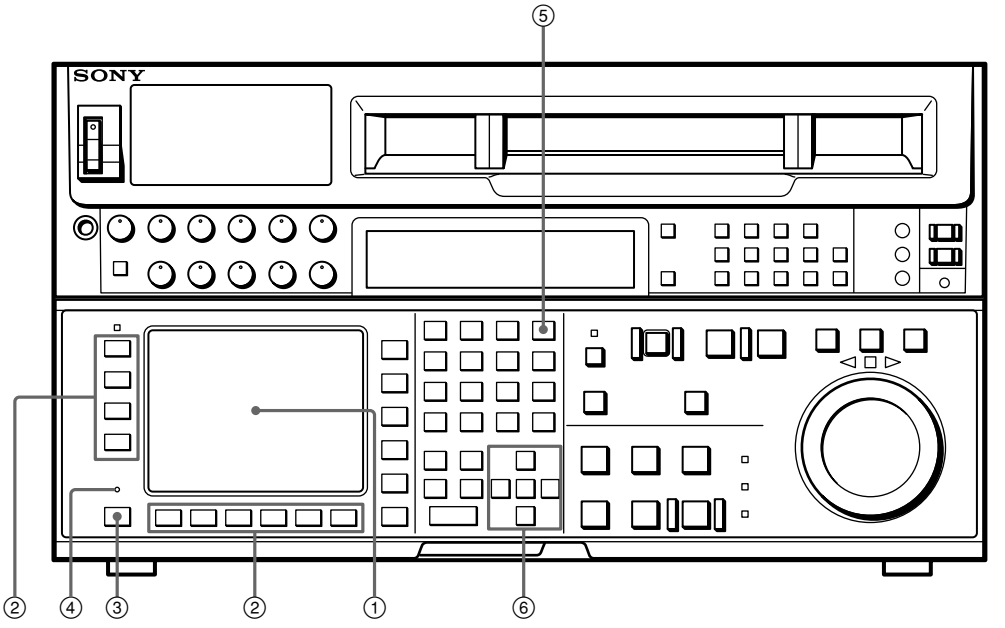
ALTERNATIVE MAINTENANCE menu

AF4 : SERVO ADJUST
AF5 : DT ADJUST
AF6 : DOWN CONVERTER ADJUST
AF7 : RF ADJUST



4-1-2. Description of Keys

Illustration and the list below describes keys and switches to be used in maintenance mode.



No.	Name	Function
①	Display	Displays the menu window selected from a menu. Each of menu windows indicates the functions assigned to each of function keys (F1 to F10) and the information necessary in set up such as timecode.
②	Function select key	Used in set up the function displayed on menu window.
③	ALT(Alternative) key	When pressed, set up parameters indicated on menu window change to other set up parameters. When pressed again, the set up parameters return to the original set up parameters.
④	MAINTENANCE switch	When pressed this switch with a pointed object, MAINTENANCE INFORMATION DISPALY menu appears.
⑤	SFT(Shift) key	Used as an auxiliary key for setting up parameters.
⑥	Cursor key	Used to move the cursor (displayed in reverse video) on the display. Also used to change the set up value.

4-1-3. Start-up/Exit of Maintenance Mode

Starting-up maintenance mode

(1) Press MAINTENANCE switch with a pointed object.
(2) MAINTENANCE INFORMATION DISPLAY menu appears on the display.
(3) Press F8 (MAINTE EXEC) key while pressing SFT (Shift) key.
Maintenance menu appears on the display.
(4) Press ALT (Alternative) key from MAINTENANCE menu. ALTERNATIVE MAINTENANCE menu appears on the display.

Exiting maintenance mode

(1) Press F10 (EXIT) key from each of mode. The display returns to MAINTENANCE menu.
(2) Press F10 (EXIT) key from MAINTENANCE menu. The display returns to MAINTENANCE INFORMATION DISPLAY menu.
(3) Press F10 (EXIT) key from MAINTENANCE INFORMATION DISPLAY menu. The display returns to HOME menu.

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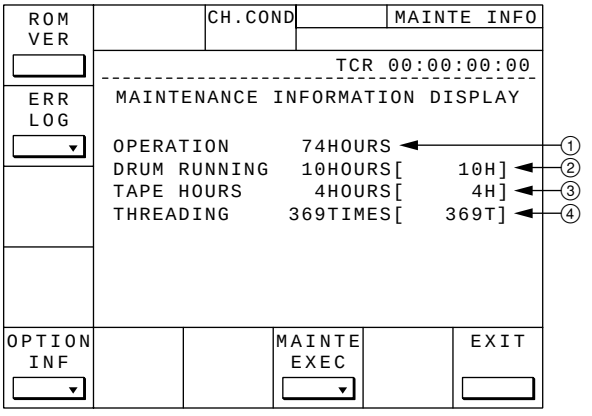
4-2. Maintenance Information Display

Overview



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

① Total operating time of the unit while turning the power ON.
② Total time of drum running. Value between [ ] shows the total time of drum running after resetting.
③ Total time of tape running. Value between [ ] shows the total time of tape running after resetting.
④ Total times of tape threading. Value between [ ] shows the total times of tape threading after resetting.

F1 (ROM VER) Key :
Version No. of ROMs (including the ones in the microprocessor), the installing option and the serial number of this unit are indicated.

F2 (ERR LOG) Key :
Detected error(s) occurred in the system of the unit and displays a list of logged error(s).

F5 (OPTION INF) Key :
Indicated the installing option board(s).

F8 (MAINTE EXEC) Key :
Press this key while pressing SFT (Shift) key. MAINTENANCE menu appears on the display and the unit enters into maintenance mode.
(For details of maintenance menu, refer to “4-3. Maintenance Menu” of this manual.)

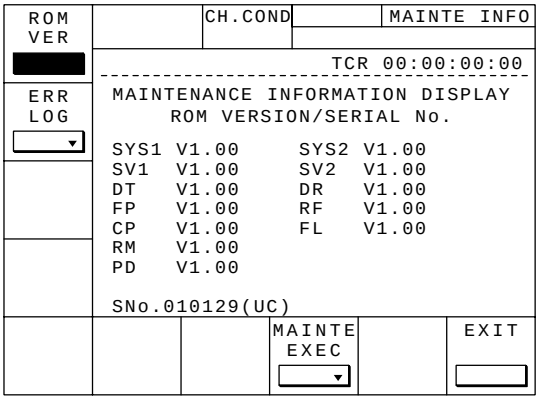
F10 (EXIT) Key :
Press this key to exit MAINTENANCE INFORMATION DISPLAY menu and returns to HOME menu.

Note
If any warning message exists, the content of the message is indicated on the display.

4-2-1. ROM VERSION/SERIAL No.

F1 (ROM VER) Key :

The version No. of ROMs (including the ones in the microprocessor), the installing option and serial No. of the unit are displayed.

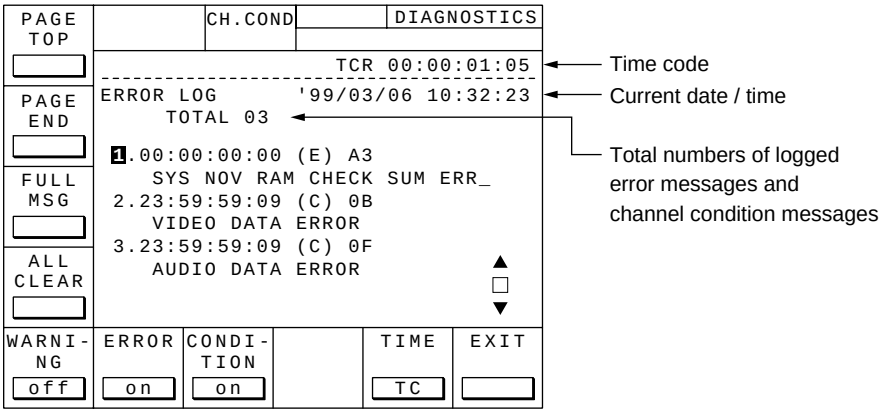


SYS1 : IC112 located on SS-88 board.
SYS2 : IC411/412 located on SS-88 board.
SV1 : IC1010 located on SS-88 board.
SV2 : IC1024 (microprocessor) located on SS-88 board.
DT : IC2110 located on SS-88 board.
DR : IC106 (microprocessor) located on DR-307 board.
RF : IC900 located on EQ-85 board.
FP : IC7 (microprocessor) located on FP-103 board.
FL : Microprocessor located in FL indicator module (audio level meter).
CP : IC114 located on CP-266 board.
RM : IC2 (microprocessor) located on RM-130 board (indicated only when installing option BKDW-509).
PD : IC1 (microprocessor) located on PD-94 board. (indicated only when installing option HKDV-507).

4-2-2. Error Logger

F2 (ER R LOG) Key :

Detected the error(s) occurred in the system of the unit and displays a list of logged error(s) messages.



1. LOG LIST

Indicated the logged messages.

F1 **(PAGE TOP) Key** : Moved the cursor to the top page.

F2 **(PAGE END) Key** : Moved the cursor to the page where the last message exists.

F3 **(FULL MSG) Key** : Indicated the message (on which the cursor is parking) in full message.

F5 **(WARNING) Key** : Selected whether to indicate warning messages or not.
on (setting at shipping from factory)/off

F6 **(ERROR) Key** : Selected whether to indicate error messages or not.
on (setting at shipping from factory)/off

F7 **(CONDITION) Key** : Selected whether to indicate channel condition messages or not.
on (setting at shipping from factory) /off

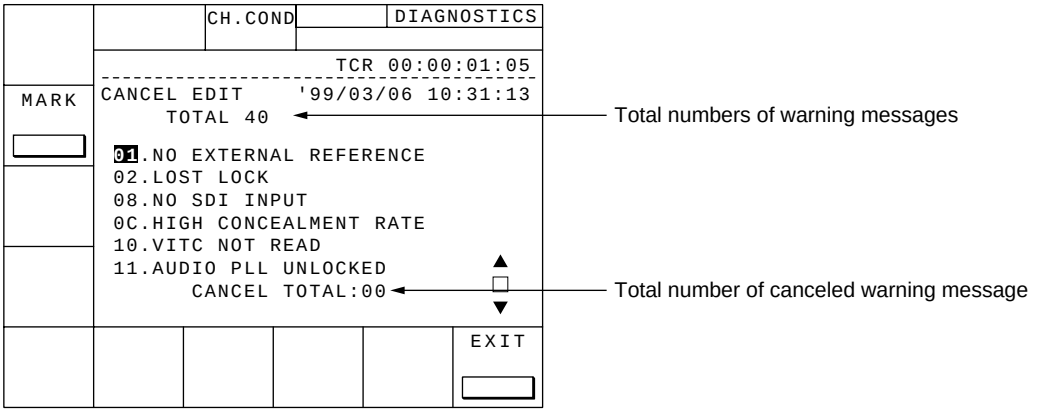
F9 **(TIME) Key** : Selected to indicate whether time code or real time.
TC (setting at shipping from factory) / REAL

SFT + F4 **(ALL CLEAR) Key** : Clears the logged error messages (LOG LIST). (SFT + F4 keys means to press SFT key while pressing F4 key.)

2. CANCEL EDIT

Selected a warning message that you want to cancel.

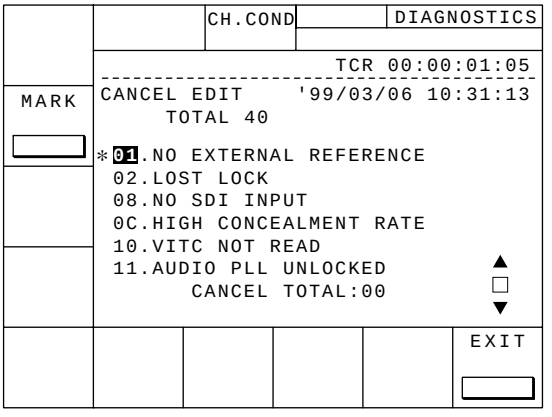
(1) Press ALT/F8 (CANCEL EDIT) keys from ERROR LOGGER menu. (ALT/F8 (CANCEL EDIT) keys means to press F8 key simultaneously with ALT key.)



(2) Select a warning message that you want to cancel using ∧ / ∨ keys and fix it by pressing F2 (MARK) key.

(3) An asterisk (∗) is indicated to the left of fixed warning message. If it is found that the fixed warning message was an incorrect one, press F2 key again.

Note Once canceled a warning message, the unit does not issue warning message (no warning message appears on the display, accordingly) even if the same situation occurred.

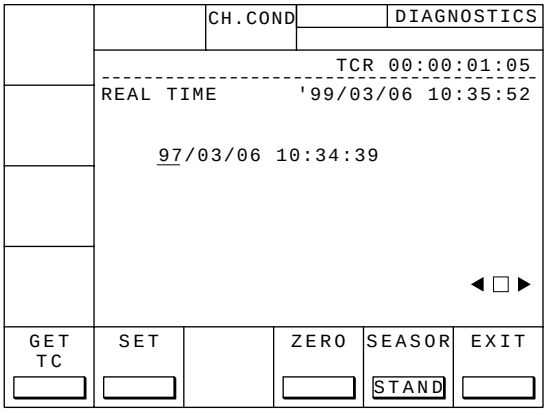


3. REAL TIME

Performs set up to the system clock.

Note If performed setting between standard time and daylight saving time, the time shifts by one hour. Even if performed change of setting where time jumps across 00:00 A.M., the date are correctly reflected.

(1) Press ALT/F9 (REAL TIME) keys from ERROR LOGGER menu. (ALT/F9 (REAL TIME) keys means to press F9 key simultaneously with ALT key.)



SFT+F5 **(GET TC) keys** : Acquired the current time code to the system clock.

SFT+F6 **(SET) keys** : Setting date/time data.

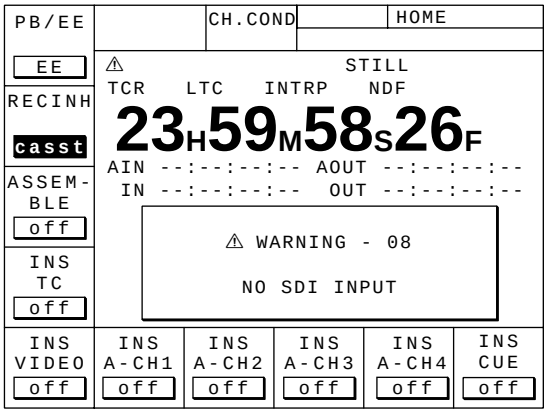
SFT+F8 **(ZERO) keys** : Zero adjustment of minute/second data of system clock.

SFT+F9 **(SEASON) keys** : Setting between standard time and daylight saving time.
STAND (setting at shipping from factory) / SUMMER

(SFT+F5 keys means to press F5 key while pressing SFT key.)

4-2-3. Warning Messages

Indicated warning messages and their meaning are as follows:



Code	Message indicated on time data display area	Content
01.	NO EXTERNAL REFERENCE	No reference signal is input to the REF INPUT connector. The unit is now operating on the internal reference signal.
02.	LOST LOCK	Capstan servo is stepped out of locking during playback, recording or editing operation.
08.	NO SDI INPUT	No serial digital input signal is detected.
09.	NO SDI AUDIO INPUT	No audio data in the serial digital input signal is detected.
10.	VITC NOT READ	Correct reading of VITC signal on the tape is impossible.
11.	AUDIO PLL UNLOCKED	PLL of the audio clock generator does not lock to the video reference signal.
14.	NO PB RF SIGNAL	PB head is unable to read the digital data on the tape.
15.	INCONSISTENT EMPHASIS	Emphasis information in reproduced data from the tape is inconsistent with the emphasis condition of system. **Note** Select the menu again or check the tape as required.
1C.	NO DA1/DA2 INPUT	No carrier signal is not detected at the inputs of DA1/DA2 channels.
20.	NO DA3/DA4 INPUT	No carrier signal is not detected at the inputs of DA3/DA4 channels.
2D.	INVALID SDI DATA	Data of the serial digital input signal is invalid.
34.	NO CASSETTE COMPARTMENT MODE	The cassette compartment is not installed.
3B.	NO LTC REPRODUCED	No LTC signal is recorded on the tape.
45.	DT UNLOCKED	The DT is not traced during playback.
50.	PROCESSOR IS IN TEST MODE	The processor is in test mode.
55.	VIDEO PLL UNLOCKED	PLL of the video clock generator does not lock to the video reference signal.
59.	INPUT AUDIO DATA MISMATCH 32.0 K	Sampling frequency of the digital audio input signal is different from 48 kHz.
5A.	INPUT AUDIO DATA MISMATCH 44.1 K	Sampling frequency of the digital audio input signal is different from 48 kHz.

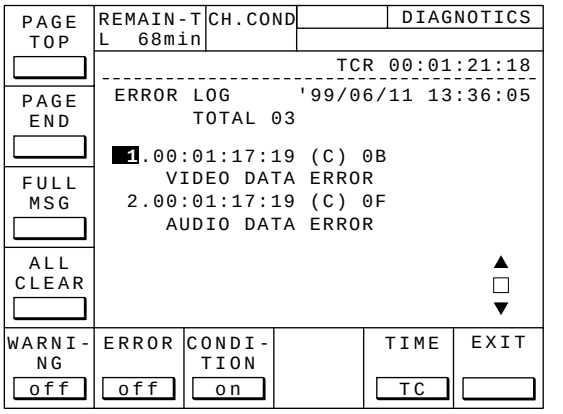
4-2-4. Error Messages

Indicated error messages and their meaning are as follows:

Code	Message indicated on time data display area	Content
01.	REEL TROUBLE-1	Detected “tape slack” during threading or unthreading.
02.	REEL TROUBLE-2	Detected “tape slack” during search, fast-forward or rewind.
03.	REEL TROUBLE-3	Detected “tape slack” during recording or playback.
04.	REEL TROUBLE-4	Detected abnormal speed of tape running during fast-forward or rewind.
05.	REEL TROUBLE-5	Detected abnormal operation on S-side or T-side reel during cassette compartment operation, or detected abnormal current flow in S-side or T-side reel mechanism.
06.	TAPE TANSION ERROR	Detected excessive tape tension during playback or recording.
07.	CAPSTAN TROUBLE	Detected abnormal operation of capstan motor.
08.	DRUM TROUBLE	Detected abnormal operation of drum motor.
09.	TH/UNTH MOTOR TIME OUT	Detected abnormal operation during threading or unthreading.
0A.	THREADING TROUBLE	Detected incorrect ending of process for tape top when threading.
10.	DEW DETECTED	Detected dew condensation.
11.	TAPE TOP/END SENSOR TROUBLE	Detected both tape top and tape end simultaneously.
12.	TAPE TOP SENSOR TROUBLE	Detected abnormal condition in tape top sensor.
13.	TAPE END SENSOR TROUBLE	Detected abnormal condition in tape end sensor.
14.	FAN MOTOR TROUBLE	Detected abnormal operation of fan motor for cooling.
20.	CASSETTE COMPARTMENT MOTOR LOCK	Detected abnormal condition during cassette compartment operation.
21.	REEL SHIFT MOTOR LOCK	Detected abnormal condition during movement of reel tables in accordance with cassette sizes.
22.	REEL POSITION SENSOR TROUBLE MOTOR	Detected L cassette and S cassette positions of reel tables simultaneously.
92.	INTERNAL INTERFACE	Detected abnormal condition in communication between CPUs on circuit boards.
93.	CPU INITIALIZE ERROR	Detected abnormal condition in mutual check between CPUs on circuit boards at power ON.
97.	SV NV-RAM TROUBLE	Detected abnormal condition during data-read process of servo system adjustment data at power ON.
A0.	READ WRITE ERROR	Detected abnormal condition during data-write process to a RAM on SS-88 board at power ON.
A1.	SY ROM ERROR	Detected abnormal condition during data-read process from ROM in system control block at power ON.
A2.	DR NV-RAM CHECK SUM ERROR	Detected abnormal condition during read process of model data at power ON.
A3.	SYS NV-RAM CHECK SUM ERROR	Detected abnormal condition during read process of menu set up data at power ON.
A4.	PLAYER CONTROL COMMAND BUFFER FULL	Transmission buffer of 9-pin serial communication for player control becomes full.
A5.	RS422 REMOTE COMMAND BUFFER FULL	Received buffer of 9-pin serial communication becomes full.
B0.	DT HARD ERROR	Detected abnormal condition during distortion erasure process of DT head.
B1.	TCG HARD ERROR	Hardware error in time code generator IC and its periphery.

4-2-5. Channel Condition Messages

Indicated channel condition messages and their meaning are as follows:

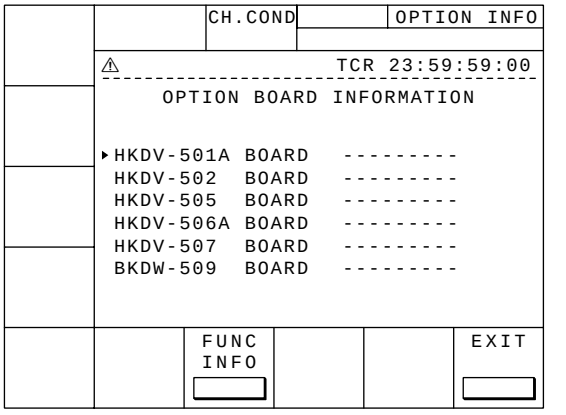


Code	Message indicated on time data display area	Content
1.	VIDEO DATA ERROR	Detected degradation in video playback signal.
2.	AUDIO DATA ERROR	Detected degradation in audio playback signal.

4-2-6. Option Information

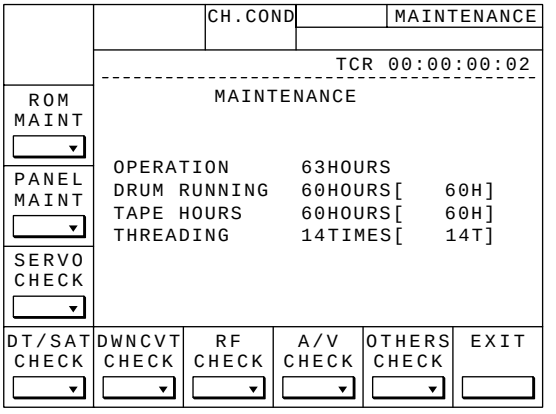
F5 (OPTION INF) Key :
Indicated the installing option board(s).

F7 (FUNC INFO) Key : Indicated the explanation of the option board (on which the cursor is parking).



4-3. Maintenance Menu

Overview



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

F2 (ROM MAINT) Key :

Performs download or upload of ROM in the unit.

Note This is the menu only for service. Do not use this menu because this menu may be damaged to the correct set up of this unit.

F3 (PANEL MAINT) Key :

Performs self-diagnostics of the control panel.

F4 (SERVO CHECK) Key :

Performs automatic or semi-automatic checking to servo system.

F5 (DT/SAT CHECK) Key :

Performs checking to DT system and SAT operation.
SAT: Supplement Auto Tracking

F6 (DWNCVT CHECK) Key :

Performs checking to DOWN CONVERTER system.

F7 (RF CHECK) Key :

Performs checking to RF system.

F8 (A/V CHECK) Key :

Performs set up to system's E-E function and to audio/video test signal generator in this unit during maintenance mode.

F9 (OTHERS CHECK) Key :

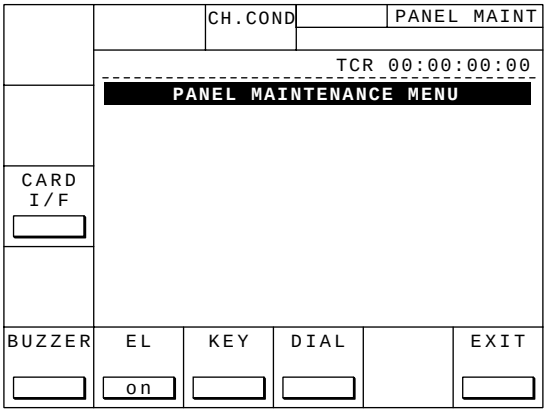
F10 (EXIT) Key :

Exits MAINTENANCE menu and returns to MAINTENANCE INFORMATION DISPLAY menu.

4-3-1. PANEL MAINTENANCE Menu (F3 : PANEL MAINT)

Overview

Performs self-diagnostics of the control panel.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

F3 (CARD I/F) Key :
Performs test on memory card interface.

F5 (BUZZER) Key :
Performs test on the buzzer.

F6 (EL) Key :
Performs tests on the display.

F7 (KEY) Key :
Performs tests on the function keys, switches and LEDs.

F8 (DIAL) Key :
Performs tests on the search dial.

F10 (EXIT) Key :
Exits PANEL MAINTENANCE menu and returns to MAINTENANCE menu.

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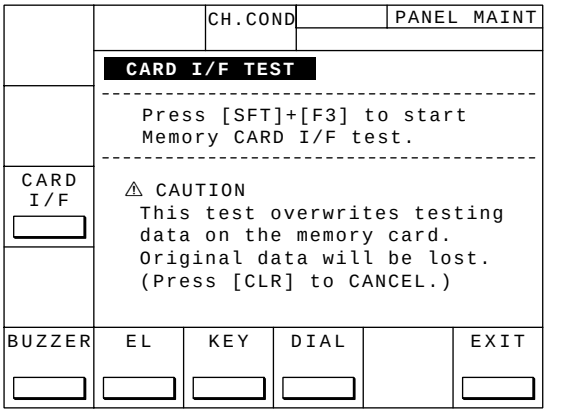
F3 (CARD I/F) Key :

Note Do not use a memory card in which necessary data has been saved. Such data may be erased during this test. Memory card is inserted or extracted even if the power is turned ON.

(1) Insert a memory card to the unit.
(2) Press F3 key. A caution message appears on the display in this case.
(3) Press F3 key while pressing SFT key. Save/recall testing is executed.
(4) When save/recall operation is normal, message CARD I/F test PASSED. appears on the display. If the card interface or the memory card was defective, message CARD I/F test FAILED. appears on the display.
(5) Press CLR key to abort the process of testing.



F5 (BUZZER) Key :

Performs test on the buzzer.

Set up sequentially changes high→low→high at every press of F5 key and the buzzer sounds at the level indicated on the display.

F6 (EL) Key:

Performs tests on the display.

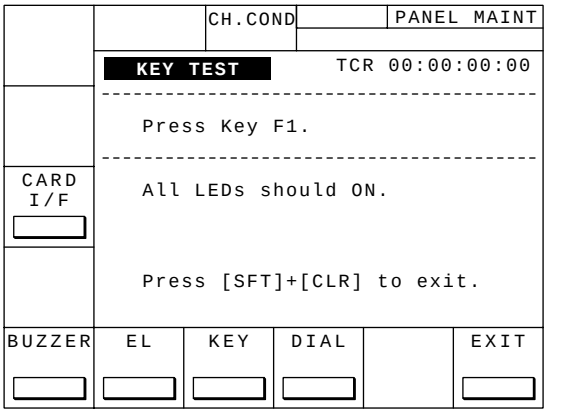
Various patterns appear on the display by pressing F6 key. Patterns change at every press of F6 key.

on (set up at shipping from factory) : The display is fully illuminated.
off : The display is fully extinguished.
V bar : Test pattern consisting of vertical lines is displayed.
H bar : Test pattern consisting of horizontal lines is displayed.

F7 (KEY) Key :

Performs tests on the keys, switches and LEDs.

(1) Press keys in accordance with the message on the menu to perform the test. Check that the buzzer sounds each time when pressed a key.
(2) When all the tests completed, message Key TEST passed. appears. If detected any abnormal condition in keys and/or switches, no buzzer sounds even if you pressed a key and the test does not proceed any further.
(3) Press SFT key and CLR key simultaneously to abort the process of testing.



F8 (DIAL) Key:

Performs tests on the search dial.

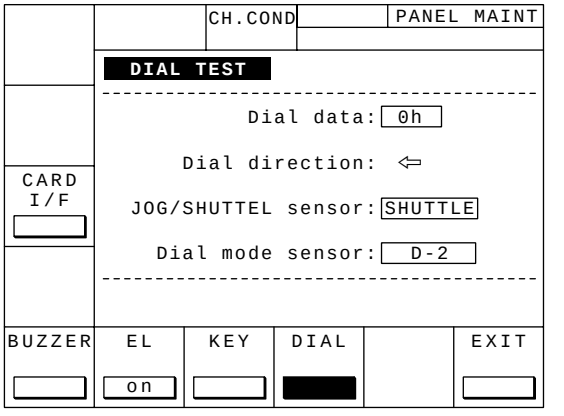
Perform tests on the search dial and dial interface, and confirm the following menu indications:

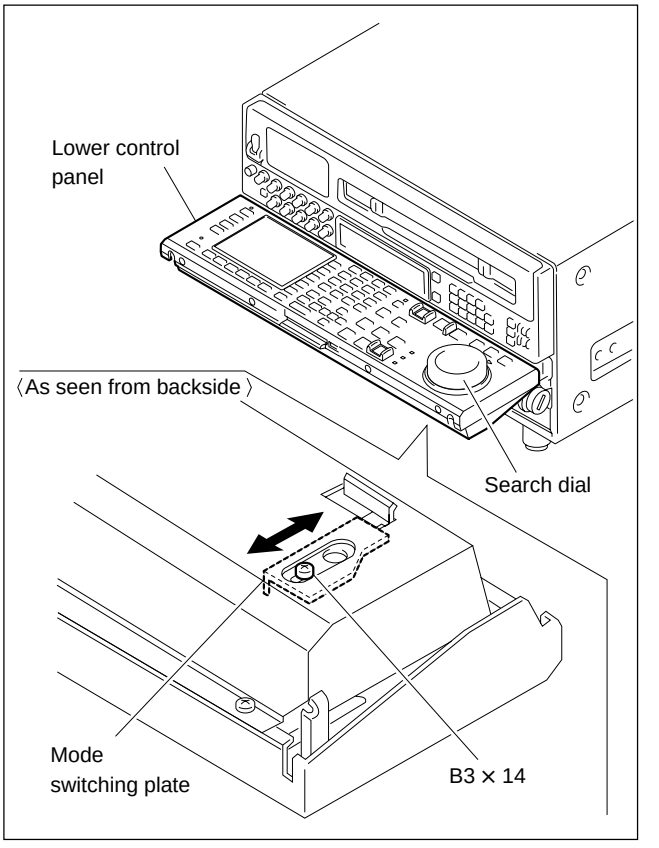
Dial data : The number changes by turning the search dial and 2ch is indicated when turned the dial to the leftmost or rightmost position. When the search dial is at its center position, 0h is indicated.

Dial direction : The arrow changes its direction by turning the search dial. ⇨ is indicated when the search dial is set to right side of its center position, or ⇦ is indicated when the search dial is set to left side of the center position.

JOG/SHUTTLE sensor : JOG is indicated while the search dial is pressed and SHUTTLE is indicated when released pressing the search dial in.

Dial mode sensor : Fix the control panel at 90-degree position and loosen a screw located at the backside of the search dial. Move the mode switching plate to the arrow direction until it would not go any further. The mode indication changes between BETACAM and D-2 (the set up at shipping from factory).





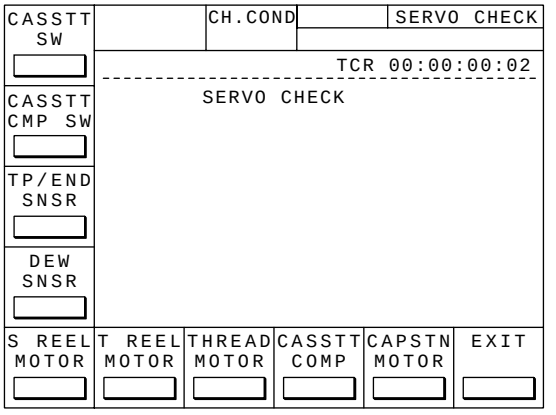
4-3-2. SERVO SYSTEM Check (F4 : SERVO CHECK)

1. SERVO CHECK menu

Overview

This section is described SERVO CHECK menu.
Unless comment specified, same result is obtained with performing any of field frequency modes.

Note If pressed ALT key from SERVO CHECK menu, the menu transits to ALT+SERVO CHECK menu.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

F1 (CASSETT SW) Key :
Performs checking to functions of cassette tab sensor and REC inhibit sensor.

F2 (CASSTT CMP SW) Key :
Performs checking to the function of compartment sensor.

F3 (TP/END SNSR) Key :
Performs checking to functions of tape top sensor and tape end sensor.

F4 (DEW SNSR) Key :
Performs checking to the function of DEW (dew condensation) sensor.

F5 (S REEL MOTOR) Key :
Performs checking to the rotation of S-reel motor.

F6 (T REEL MOTOR) Key :
Performs checking to the rotation of T-Reel motor.

F7 (THREAD MOTOR) Key :
Performs checking to the rotation of threading motor, and to functions of threading end sensor and unthreading end sensor.

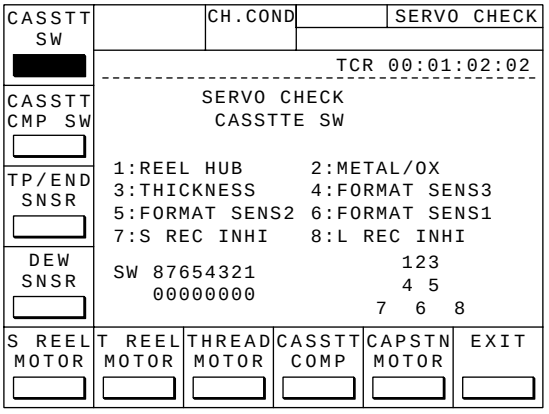
F8 (CASSTT COMP) Key :
Performs checking to the operation of cassette compartment motor.

F9 (CAPSTN MOTOR) Key :
Performs checking to the rotating direction of capstan motor.

F10 (EXIT) Key :
Exits SERVO CHECK menu and returns to MAINTENANCE menu.

F1 (CASSTT SW) Key :

Performs checking to functions of cassette tab sensor and REC inhibit sensor
(switch).



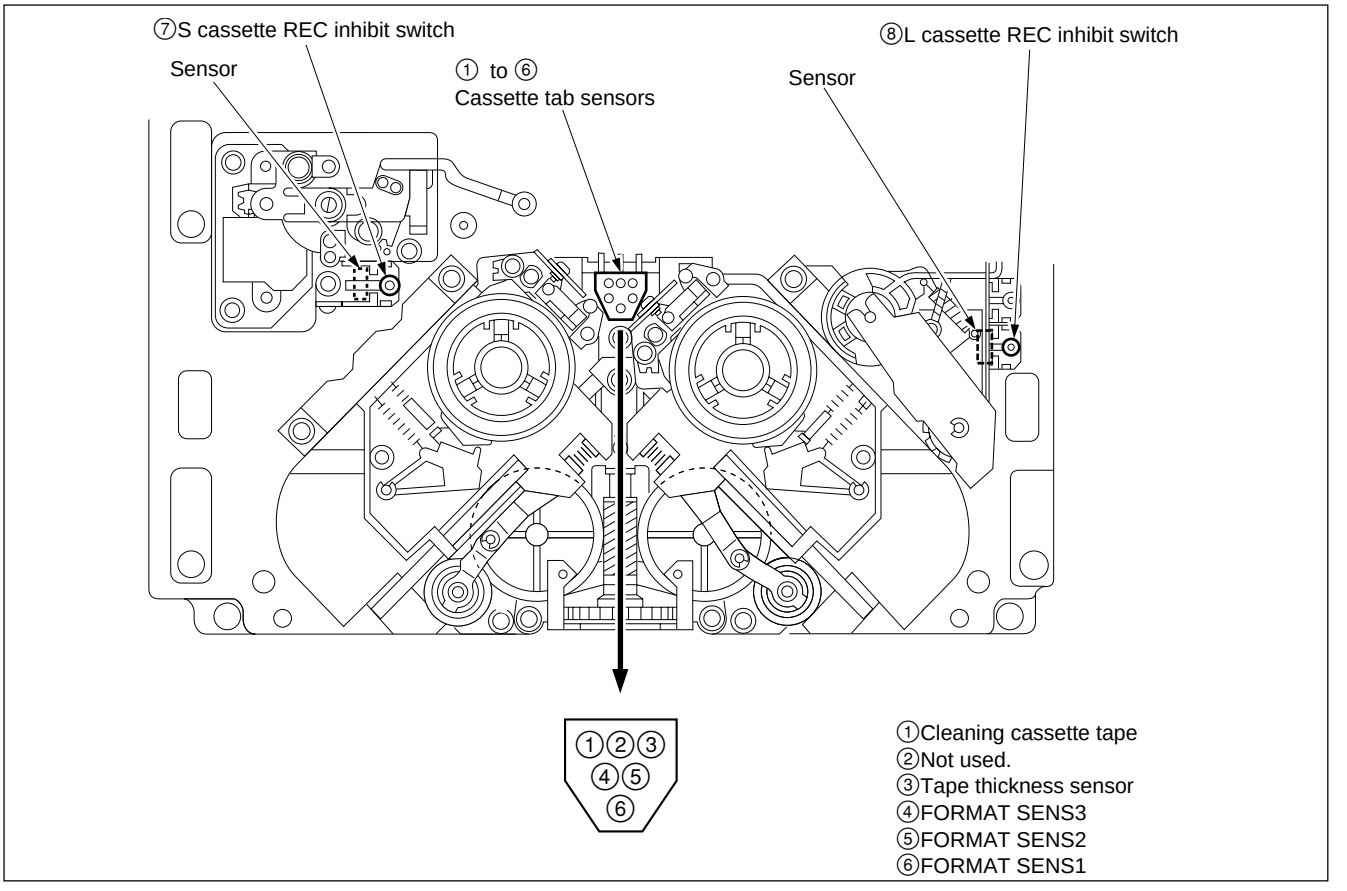
(1) Press F1 key from SERVO CHECK menu to enter to CASSTT SW menu.
(2) Sequentially press the switches/sensors ① to ⑧ shown in the illustration below with your finger tip and check that “0” located under corresponding SW No. on the display changes to “1”.
Also check that “1” returns to “0” when released the switches/sensors ① to ⑥ just pressed.

If “1” is not indicated at the specified location or if “1” does not return to “0”, check the following:
Malfunctioning of cassette tab sensors (① to ⑥) :

- Check the applicable sensor located on PTC-59 board.
- Check the sensor input circuit (DR-307 board).

Malfunctioning of REC inhibit sensor (⑦ or ⑧) :

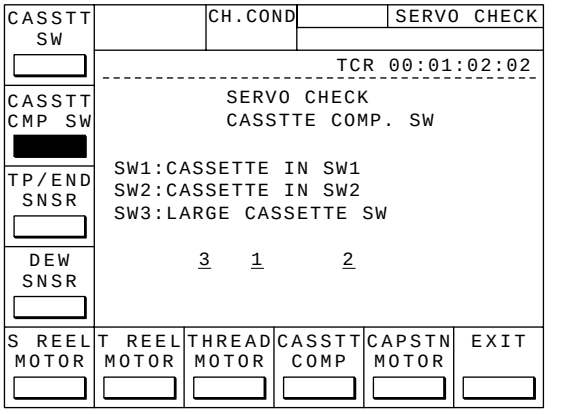
- Check the applicable sensor located on HN-264 board.
- Check the sensor input circuit board (DR-307 board).



F2 (CASSTT CMP SW) Key :

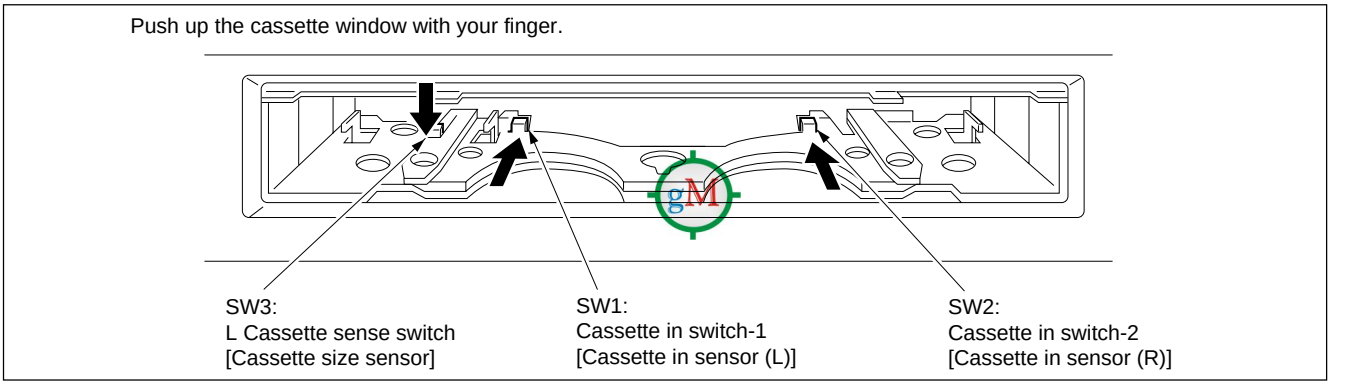
Performs checking to the function of compartment sensors (switches).

(1) Press F2 key from SERVO CHECK menu to enter to CASSETTE COMP.SW menu.
(2) Sequentially press the switches SW1 to SW3 in the illustration below to the arrow directions with your finger tip and check that corresponding SW No. located on the display changes to ■ .
Also check that "M" returns to SW. No. when released the switch just pressed.

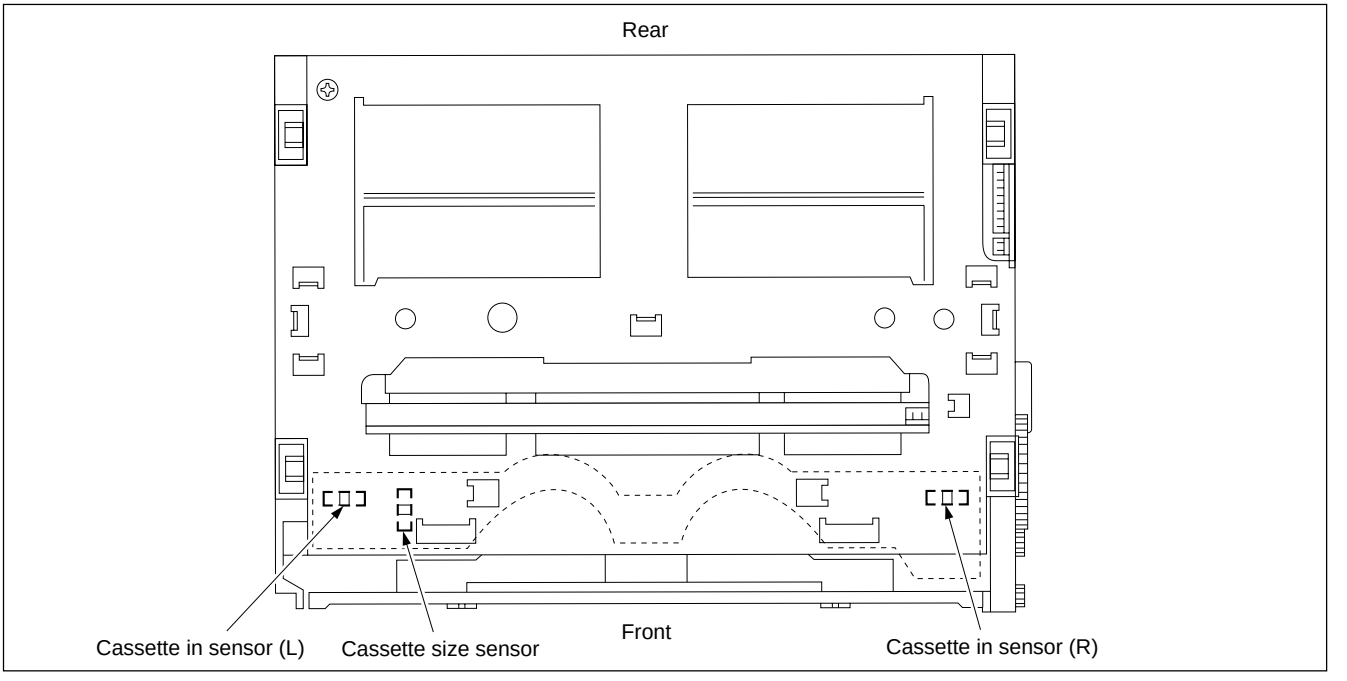


If ■ is not indicated on the specified location or ■ does not return to SW No., check the following:

- Check the applicable sensor located on PC-70 board.
- Check the sensor input circuit board (DR-307 board).



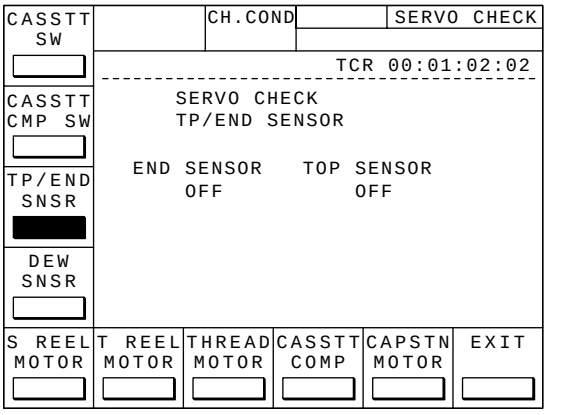
Location of switches in cassette compartment



Top view of cassette compartment

F3 (TP/END SNSR) Key :

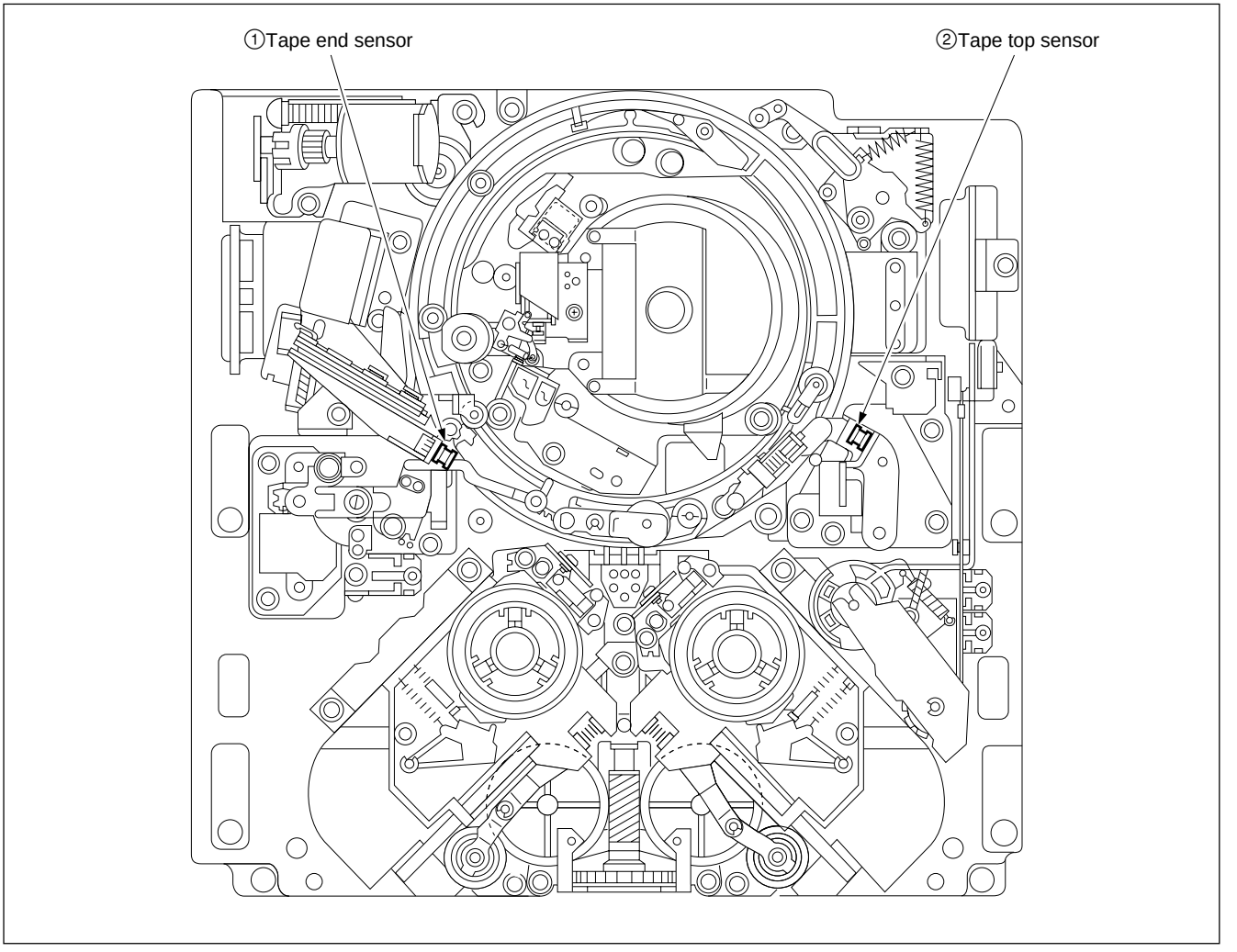
Performs checking to the functions of tape top sensor and tape end sensor.



(1) Press F3 key from SERVO CHECK menu to enter to TP/END SENSOR menu.
(2) Put a screw driver or the like close to sensor ① or ② in the illustration below and check that OFF indicated on the display changes to ON!.
Also check that ON! returns to OFF when keeping the screw driver apart from the sensor.

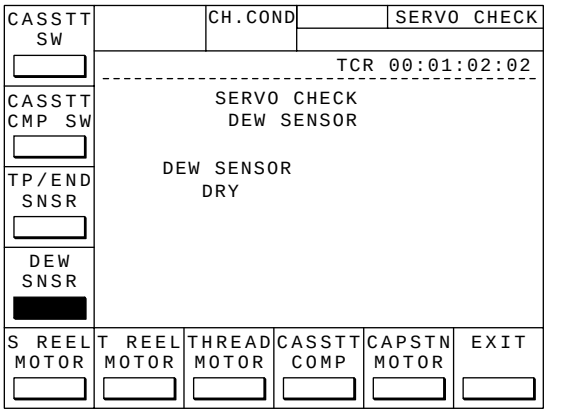
If ON! is not indicated in the specified location or ON! does not return to OFF, check the following:

- Check the sensor itself.
- Check the sensor input circuit board (DR-307 board).



F4 (DEW SNSR) Key :

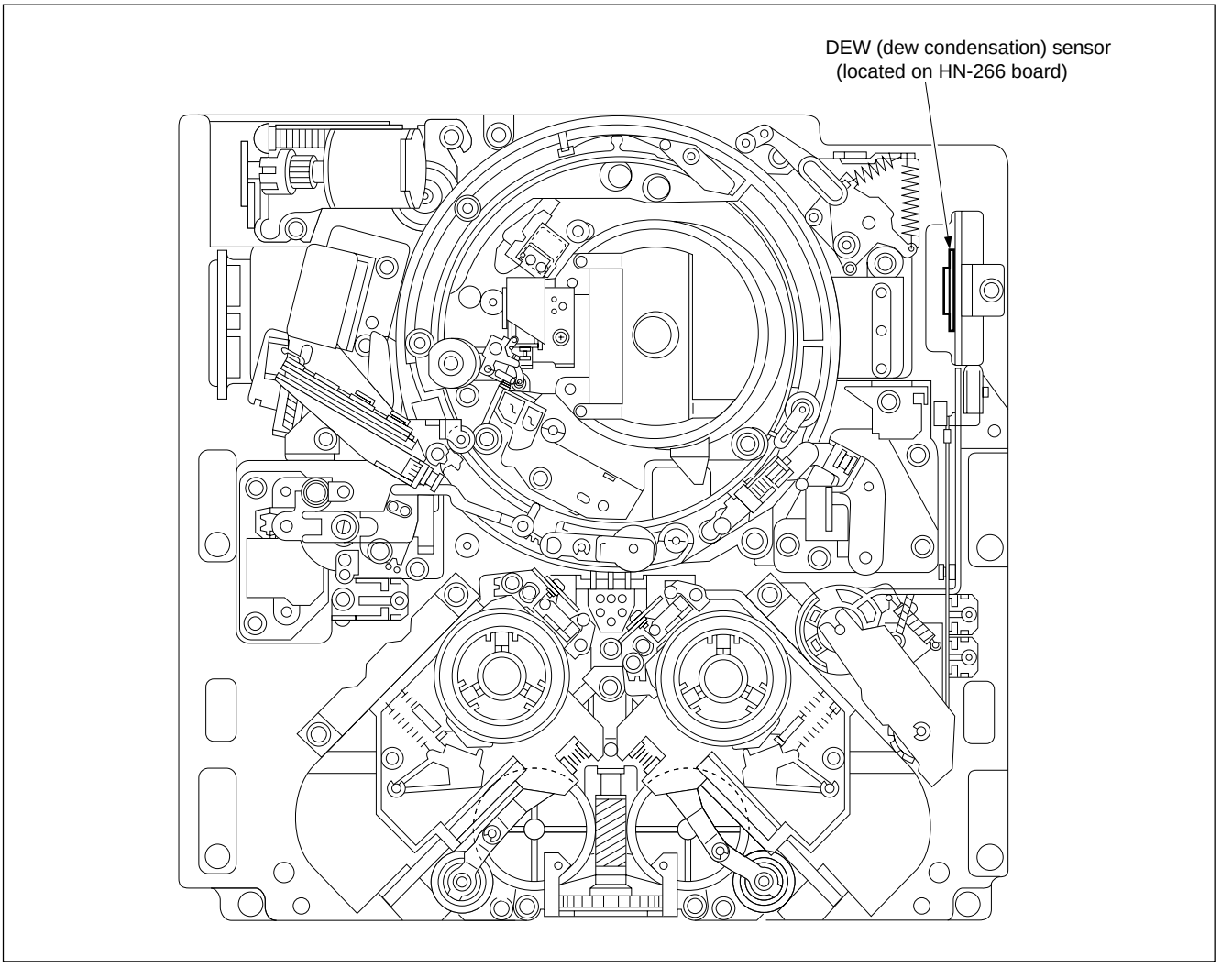
Performs checking to the function of DEW (dew condensation) sensor.



(1) Press F4 key from SERVO CHECK menu to enter to DEW SENSOR menu.
(2) Lightly touch the sensor with a swab moistened with water and check that DRY indicated on the display changes to WET!.
(3) Wipe the sensor with a dry swab to remove the moisture or blow the sensor to evaporate the moisture with a blower. When checked again after turning the power OFF, check that WET! indicated on the display returns to DRY.

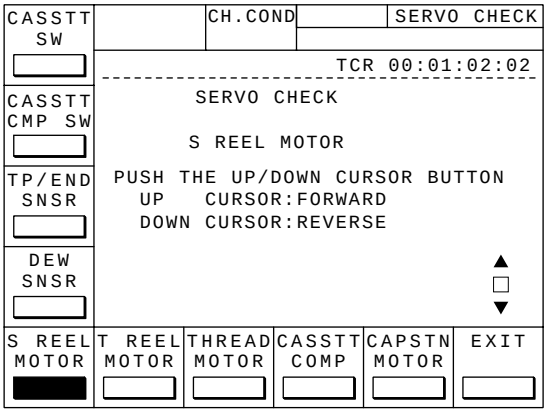
If the indication does not change from DRY to WET! even if moistened the sensor, check the following:

- Check the sensor itself.



F5 (S REEL MOTOR) Key :

Performs checking to the rotation of S-reel motor.



(1) Press F5 key from SERVO CHECK menu to enter to S REEL MOTOR menu.
(2) With ∧ and ∨ keys, run S-reel motor. (The motor runs only when pressed these keys.)

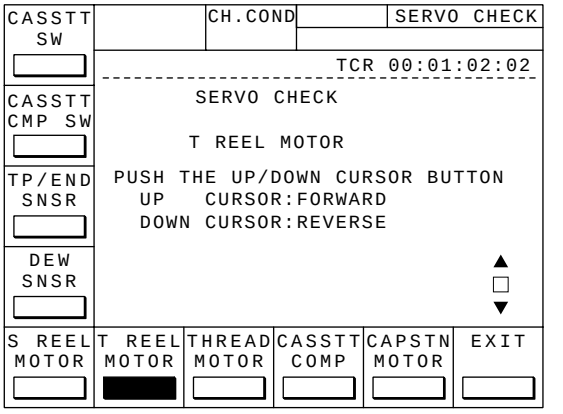
Cursor key	Rotating direction of motor
∧	FORWARD (↺)
∨	REVERSE (↻)

(3) After S brake solenoid is operated and S reel brake is released, check that S reel motor rotates to the direction specified by the cursor key.

If you are unable to hear the clicking sound of S-brake solenoid when it is operated or when S-reel motor does not rotate to the direction specified by the dial, check S-reel motor driver circuit board (DR-307 board).

F6 (T REEL MOTOR) Key :

Perform the checking to rotation of T-reel motor.

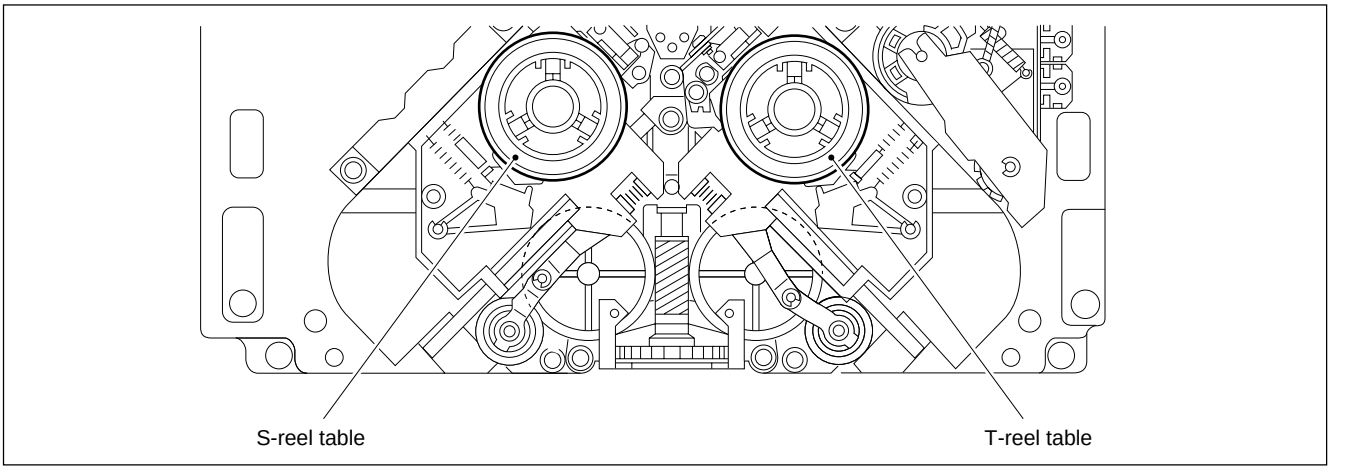


(1) Press F6 key from SERVO CHECK menu to enter to T REEL MOTOR menu.
(2) With ∧ and ∨ keys, run T-reel motor. (The motor runs only when pressed these keys.)

Cursor key	Rotating direction of motor
∧	FORWARD (↺)
∨	REVERSE (↺)

(3) After T brake solenoid is operated and T reel brake is released, check that T reel motor rotates to the direction specified by the cursor key.

If you are unable to hear the clicking sound of T-brake solenoid when it is operated or when T-reel motor does not rotate to the direction specified by the dial, check T-Reel motor driver circuit board (DR-307 board).



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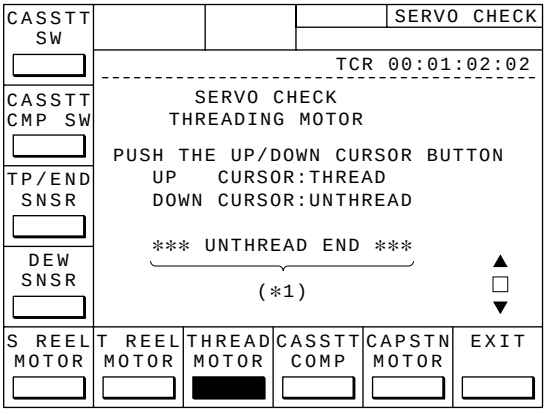
F7 (THREAD MOTOR) Key :

Performs checking to rotation of threading motor and to functions of thread end sensor and unthread end sensor.

(1) Press F7 key from SERVO CHECK menu to enter to THREADING MOTOR menu.
(2) With ∧ and ∨ keys, rotate the threading motor. (The threading motor is operated while pressing these keys.)

Note

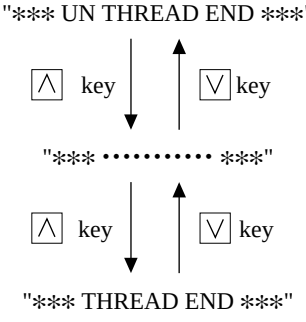
Operate the threading motor in low revolution in the proximity of end positions in both threading and unthreading process.



With the manipulation above, the threading ring moves as shown in the list below:

Cursor key	Movement of threading ring
∧	THREADING
∨	UNTHREADING

Also check that the indication on the portion marked with (*1) of the display changes as illustrated below:



If the threading motor does not rotate, check the following:

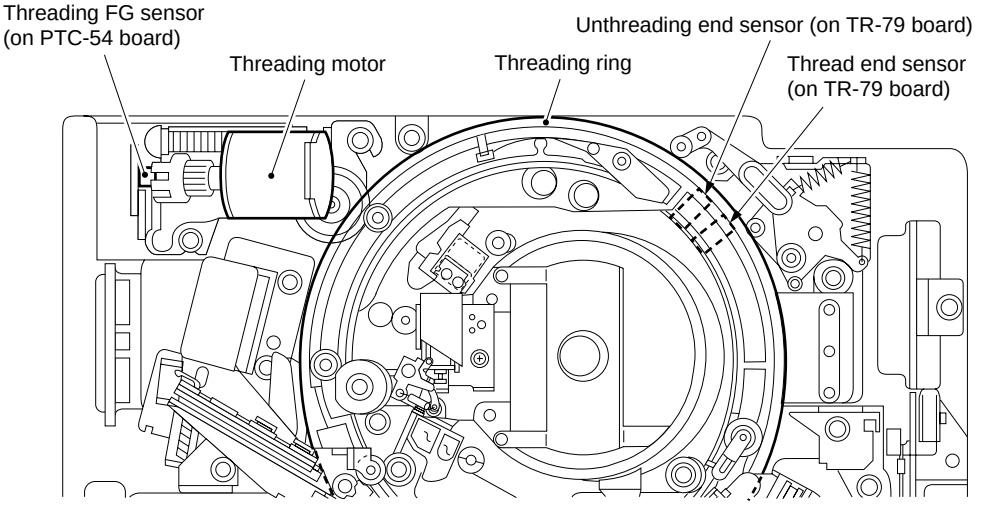
- Check the threading motor itself and FG sensor located on PTC-54 board.
- Check the motor driver circuit and FG amp circuit located on DR-307 board.

If "••••••••••" persists to appear even if the threading ring is on thread end or on unthread end position, check the following:

- Check the thread end sensor and the unthread end sensor located on TR-79 board.

Note

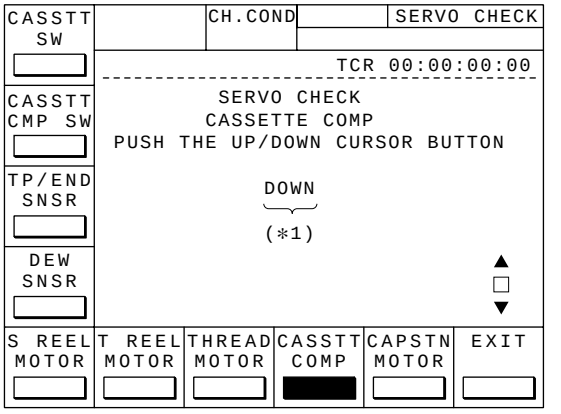
If exit THREADING MOTOR menu while the threading ring is not on the unthread end position, the threading ring automatically returns to unthread end position.


Threading FG sensor (on PTC-54 board)
Threading motor
Threading ring
Unthreading end sensor (on TR-79 board)
Thread end sensor (on TR-79 board)

(Threading ring is on unthreading end position.)

F8 (CASSTT COMP) Key :

Performs checking to the operation of cassette compartment motor and to the function of cassette down sensor.



(1) Press F8 key from SERVO CHECK menu to enter to CASSETTE COMP menu.
(2) Press ∧ and ∨ keys.
Check that the cassette compartment moves to its down position. Also check that the indication on the portion marked with (∗1) of the display changes as illustrated below at every press of the keys.

UP → HORIZ. → VERT. → DOWN

(3) Press ∧ and ∨ keys again.
Check that the cassette compartment moves to its up position.
Also check that the indication on the portion marked with (∗1) of the display changes as illustrated below at every press of the keys.

DOWN → VERT. → HORIZ. → UP

If the cassette compartment motor does not rotate, check the following:

- Check the cassette compartment motor.
- Check the motor driver circuit located on DR-307 board.

If the indication does not change although the cassette compartment normally moves up and down, check the following:

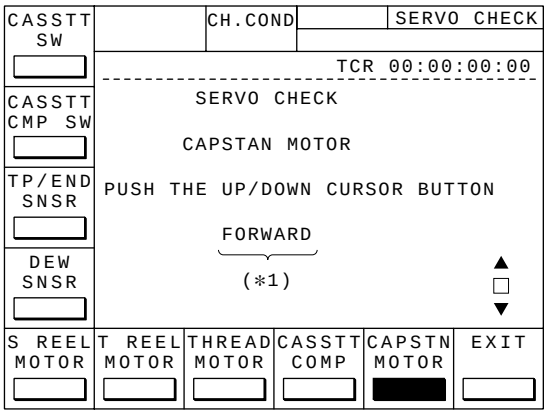
- Check the cassette down sensor.
- Check the sensor input circuit (DR-307 board).

Note

If exit CASSTT COMP menu while the cassette compartment is not on the up position, the cassette compartment automatically returns to up position.

F9 (CAPSTN MOTOR) Key :

Performs checking to the rotating direction of capstan motor.



(1) Press F9 key from SERVO CHECK menu to enter to CAPSTAN MOTOR menu.
(2) Press ∧ and ∨ keys.
Check that the capstan motor rotates to FORWARD direction (↻) and stops. Also check that “FORWARD OK” is indicated on the portion marked with (∗1) of the display.
(3) Press ∧ and ∨ keys again.
Check that the capstan motor rotates to REVERSE direction (↺) and stops. Also check that “REVERSE OK” is indicated on the portion marked with (∗1) of the display.

If the capstan motor does not rotate, check the following:

- Check the capstan motor and FG amp input circuit (on DR-307 board).

If “OK” is not indicated on the display although the capstan motor normally rotates, check the following:

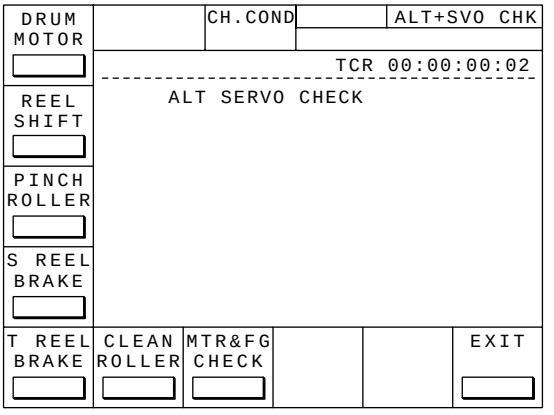
- Check the capstan motor and FG amp input circuit (on DR-307 board).

2. ALT+SERVO CHECK menu

Overview

This section is described “ALT+SERVO CHECK menu”. Press [ALT] key from SERVO CHECK menu to enter to ALT+SERVO CHECK menu.

Note If pressed [ALT] key from ALT+SERVO CHECK menu, it enter to SERVO CHECK menu.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

[F1] (DRUM MOTOR) Key :
Performs checking to the rotation of drum motor.

[F2] (REEL SHIFT) Key :
Performs checking to the operation of reel shift motor and to the function of reel position sensors.

[F3] (PINCH ROLLER) Key :
Performs checking to the operation of pinch roller solenoid.

[F4] (S REEL BRAKE) Key :
Performs checking to the operation of S-reel brake solenoid.

[F5] (T REEL BRAKE) Key :
Performs checking to the operation of T-reel brake solenoid.

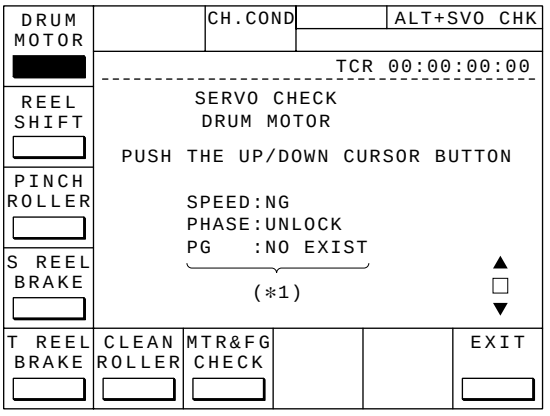
[F6] (CLEAN ROLLER) Key :
Performs checking to the operation of cleaning roller solenoid.

[F7] (MTR & FG CHECK) Key :
Performs checking to duty ratio of S reel FG/T reel FG/capstan FG, to offset/friction level of S reel/T reel, and to torque of S reel/T reel.

[F10] (EXIT) Key :
Exits ALT+SERVO CHECK menu, and returns to MAINTENANCE menu.

F1 (DRUM MOTOR) Key :

Performs checking to the rotation of drum motor.



(1) Press F1 key from ALT+SERVO CHECK menu to enter to DRUM MOTOR menu.
(2) Press ∧ and ∨ keys. The drum motor rotates and the checking starts.
The indication on the portion marked with (∗1) of the display is as listed below:
SPEED : NG
PHASE : UNLOCK
PG : NO EXIST
(3) After a while, check that the indication on the portion marked with (∗1) of the display changes as listed below:
SPEED : OK
PHASE : LOCK
PG : EXIST

If the indication of the portion marked with (∗1) of the display does not change, check the following:

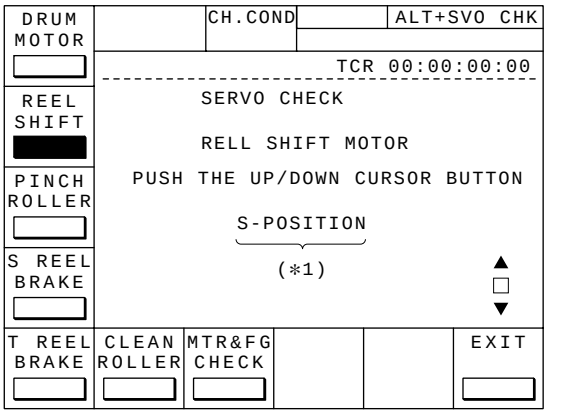
- Check the drum motor driver circuit (on DR-307 board).
- Check the drum FG amp circuit (on DR-307 board).
- Check the drum PG amp circuit (on DR-307 board).

Note

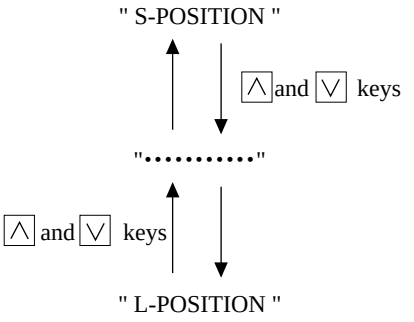
The drum motor continues to rotate until this manu exits.

F2 (REEL SHIFT) Key :

Performs checking to the operation of reel shift motor and to the function of reel position sensors.



(1) Press F2 key from ALT+SERVO CHECK menu to enter to REEL SHIFT MOTOR menu.
(2) Press ∧ and ∨ keys. Check that the reel shift motor shifts from S position to L position and back to S position from L position.
Also check that the indication on the portion marked with (∗1) of the display changes as illustrated below:

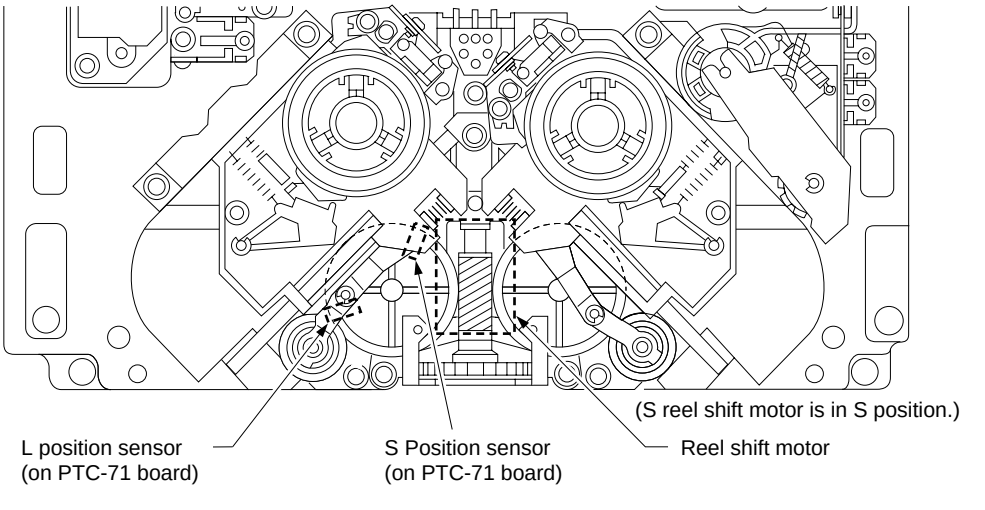


If the reel shift motor does not rotate, check the following:

- Check the reel shift motor and the motor driver circuit on DR-307 board.

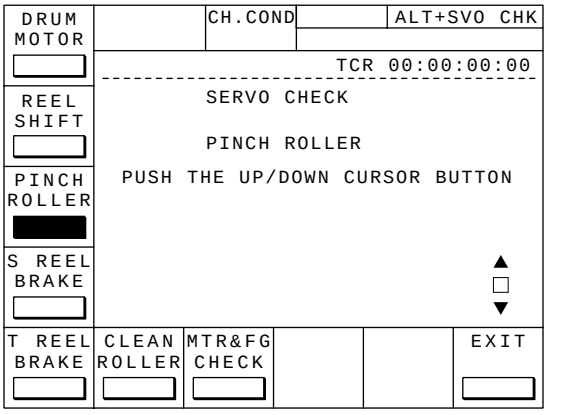
If "••••••••••" persists to appear even if the reel shift motor is in L position or in S position, check the following:

- Check L position sensor or S position sensor located on PTC-71 board.



F3 (PINCH ROLLER) Key :

Performs checking to the operation of pinch roller solenoid.



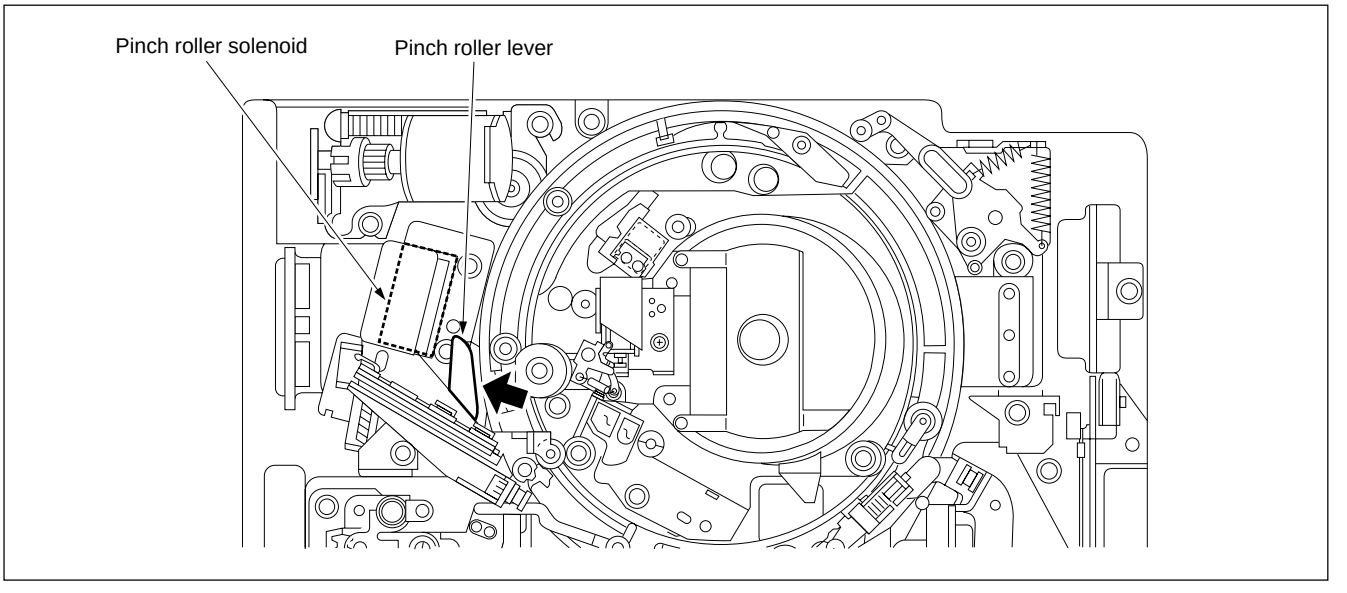
(1) Press F3 key from ALT+SERVO CHECK menu to enter to PINCH ROLLER menu.
(2) Press ∧ and ∨ keys. Check that the pinch roller solenoid is operated.
(3) Select F10 (EXIT) key or one of other menus. The drive voltage is not applied to the pinch roller solenoid and this menu exits.
(4) Gently push the pinch roller lever back to the direction of the pinch roller solenoid with your finger tip to restore the core of pinch roller solenoid to its original position.

Note

If the pinch roller solenoid is operated by pressing key, be ensure to perform the step (4) above.

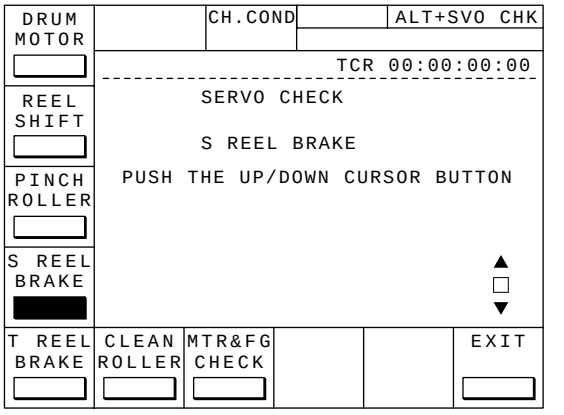
If the pinch roller solenoid is not operated, check the following:

- Check the pinch roller solenoid and its driver circuit (on DR-307 board).



F4 (S REEL BRAKE) Key :

Performs checking to the operation of S reel brake solenoid.

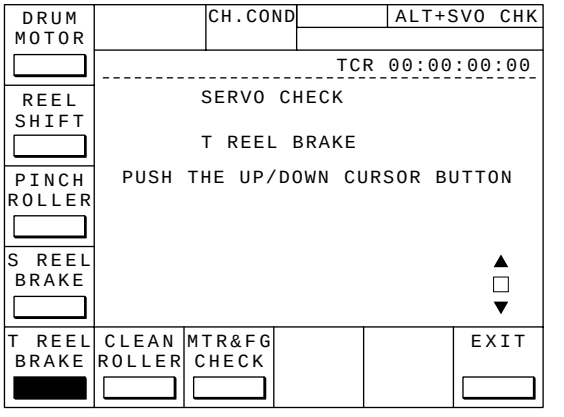


(1) Press F4 key from ALT+SERVO CHECK menu to enter to S REEL BRAKE menu.
(2) Press ∧ and ∨ keys. Check that the S reel brake solenoid is operated.
(3) Select F10 (EXIT) key or one of other menus.
The core of the S reel brake solenoid is restored to its original position and this menu exits.

If the S reel brake is not operated, check the following:
- Check the S reel brake solenoid.
- Check the driver circuit for S reel brake solenoid (on DR-307 board).

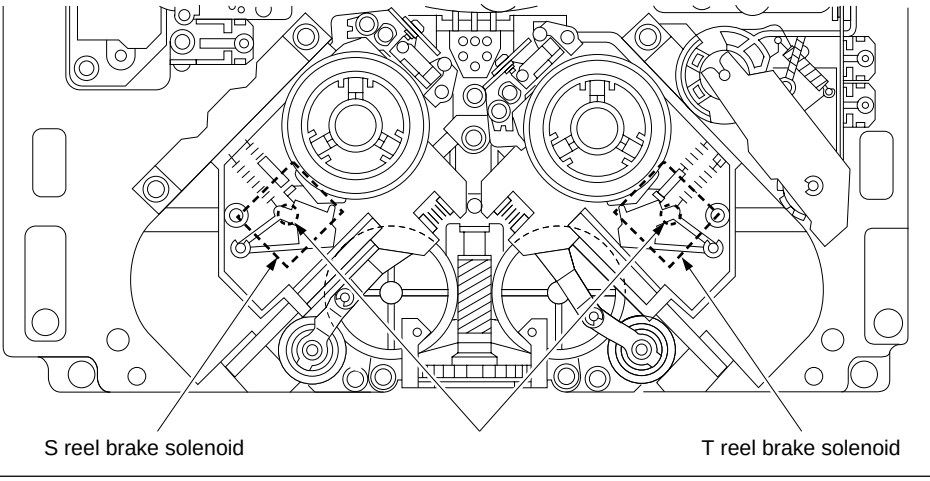
F5 (T REEL BRAKE) Key :

Performs checking to the operation of T reel brake solenoid.



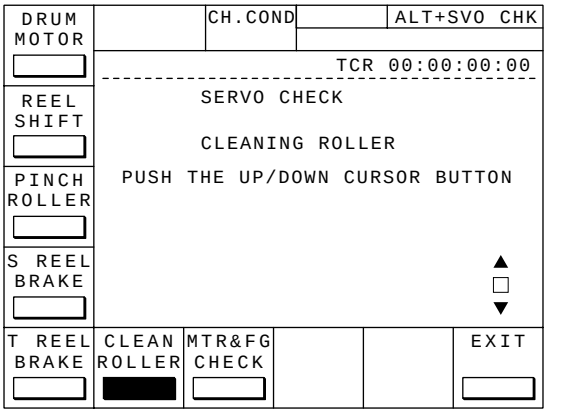
(1) Press F5 key from ALT+SERVO CHECK menu to enter to T REEL BRAKE menu.
(2) Press ∧ and ∨ keys.
Check that the T reel brake solenoid is operated.
(3) Select F10 (EXIT) key or one of other menus.
The core of the T reel brake solenoid is restored to its original position and this menu exits.

If the T reel brake solenoid is not operated, check the following:
- Check the T reel brake solenoid.
- Check the driver circuit for T reel brake solenoid (on DR-307 board).



F6 (CLEAN ROLLER) Key :

Performs checking to the operation of cleaning roller solenoid.



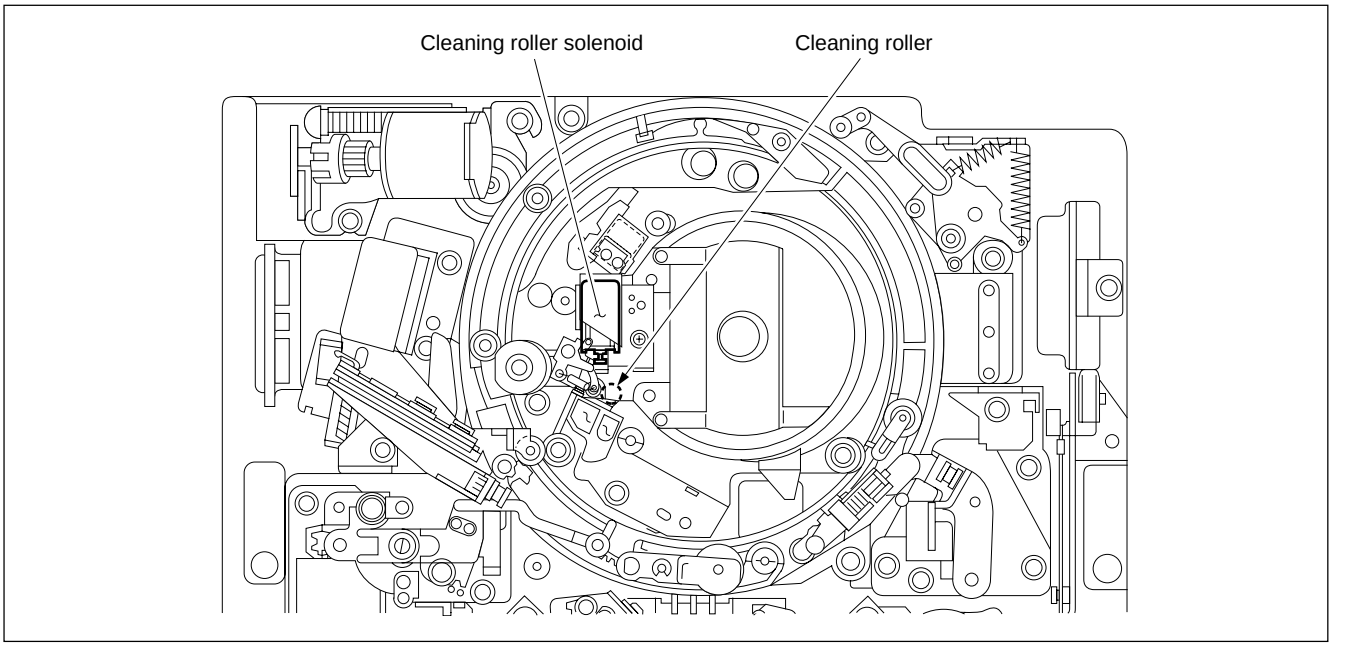
(1) Press F6 key from ALT+SERVO CHECK menu to enter to CLEANING ROLLER menu.
(2) Press ∧ and ∨ keys. Check that the cleaning roller solenoid is operated, and that the cleaning roller touches to the head drum for a moment then is separated from the head drum.

Note

The cleaning roller solenoid will be burnt out if it is operated for a long time. If the cleaning roller is not separated from the head drum, turn the power OFF immediately.

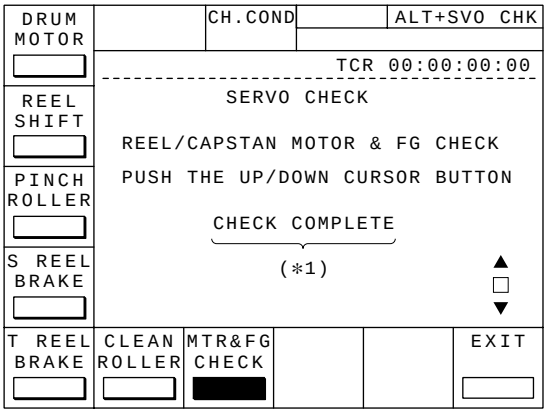
If the cleaning roller does not touch to the head drum or it is not separated from the head drum, check the following:

- Check the cleaning roller solenoid and its driver circuit (on DR-307 board).



F7 (MTR & FG CHECK) Key :

Performs automatic checking to duty ratio of S reel FG/T reel FG/capstan FG, to offset/friction level of S reel and T Reel, and to torque of S reel and T reel.



(1) Press F7 key from ALT+SERVO CHECK menu to enter to REEL/CAPSTAN MOTOR & FG CHECK menu.
(2) This menu automatic checks to following checking items:
    ① S REEL FG/MOTOR CHECK
    ② T REEL FG/MOTOR CHECK
    ③ CAPSTAN FG/MOTOR CHECK
    ④ S REEL OFFSET/FRICTION
    ⑤ T REEL OFFSET/FRICTION
    ⑥ S REEL MOTOR TORQUE
    ⑦ T REEL MOTOR TORQUE
(3) After all the checks normally completed, message “CHECK COMPLETE”appears on the display.
    If message “CHECK INCOMPLETE” appears on the portion marked with (∗1) of the display, refer to the description in the next page.

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When message “CHECK INCOMPLETE” appeared:

① S REEL FG/MOTOR CHECK
Performs checking to duty ratio of S reel FG.

Perform S reel motor check (F5: S REEL MOTOR) from SERVO CHECK menu, and if there is no problem, perform S reel FG duty adjustment (F3: S REEL FG DUTY ADJUST) from SERVO ADJUST menu.

② T REEL FG/MOTOR CHECK
Performs checking to duty ratio of T reel FG.

Perform T reel motor check (F6: T REEL MOTOR) from SERVO CHECK menu, and if there is no problem, perform T reel FG duty adjustment (F4: S REEL FG DUTY ADJUST) from SERVO ADJUST menu.

③ CAPSTAN FG/MOTOR CHECK
Performs checking to duty ratio of capstan FG.

Perform capstan motor check (F9: CAPSTAN MOTOR) from SERVO CHECK menu, and if there is no problem, perform capstan FG duty adjustment (F5: CAPSTAN FG DUTY ADJUST) from SERVO ADJUST menu.

④ S REEL OFFSET/FRICTION
Performs checking to offset/friction level of S reel.

Perform S reel motor check (F5: S REEL MOTOR) from SERVO CHECK menu, and if there is no problem, perform S reel offset/friction adjustment (F6: S REEL OFFSET/FRICTION) from SERVO ADJUST menu.

⑤ T REEL OFFSET/FRICTION
Performs checking to offset/friction level of T reel.

Perform T reel motor check (F6: T REEL MOTOR) from SERVO CHECK menu, and if there is no problem, perform T reel offset/friction adjustment (F7: T REEL OFFSET/FRICTION) from SERVO ADJUST menu.

⑥ S REEL MOTOR TORQUE
Performs checking to torque of S reel.

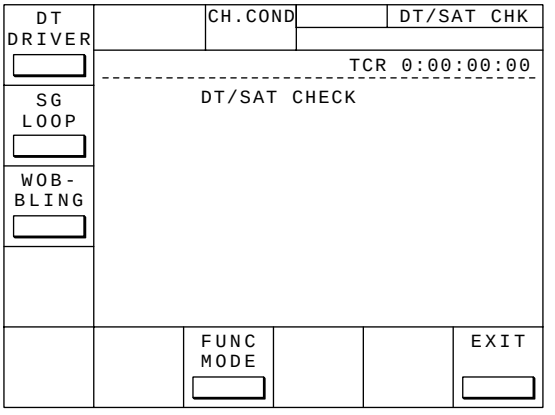
Perform S reel motor check (F5: S REEL MOTOR) from SERVO CHECK menu, and if there is no problem, perform S reel torque adjustment (F8: S REEL TORQUE ADJUST) from SERVO ADJUST menu.

⑦ T REEL MOTOR TORQUE
Performs checking to torque of T reel.

Perform T reel motor check (F6: T REEL MOTOR) from SERVO CHECK ,menu, and if there is no problem, perform T reel torque adjustment (F9: T REEL TORQUE ADJUST) from SERVO ADJUST menu.

4-3-3. DT/SAT SYSTEM Check (F5 : DT/SAT CHECK)

Overview



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

SAT : Acronym of Supplement Auto Tracking

F1 (DT DRIVER) Key :
Performs checking to bimorph driver control circuit using loop-back from bimorph driver amplifier.

F2 (SG LOOP) Key :
Performs checking to feedback loop of the strain gauge.

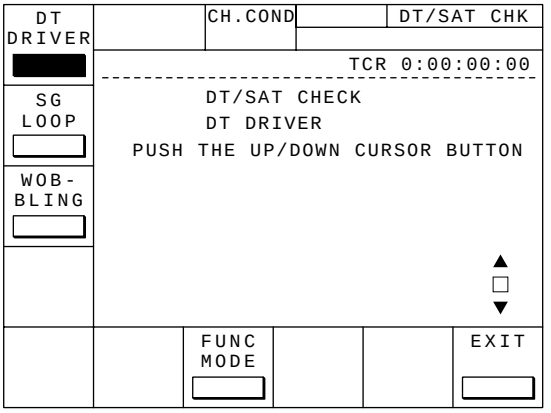
F3 (WOBBLING) Key :
Performs checking to the tracking error detect circuit and to the wobbling voltage generator circuit.

F7 (FUNC MODE) Key :
Performs checking to SAT operation within its normal operating.

F10 (EXIT) Key :
Exits DT/SAT CHECK menu, and returns to MAINTENANCE menu.

F1 (DT DRIVER) Key :

Performs checking to the bimorph driver control circuit (on SS-88 board) using loop-back from the bimorph driver amplifier (on DT-34C board).



(1) Press F1 key from DT/SAT CHECK menu to DT DRIVER menu.
(2) Press ∧ and ∨ keys. Checking to DT DRIVER starts.
(3) When the checking normally completed, message CHECK COMPLETE appears on the display.

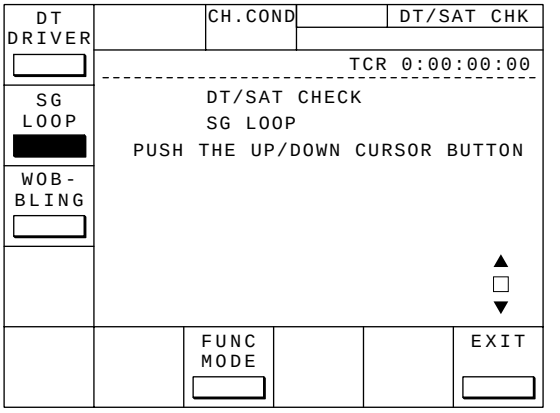
If message #CHECK INCOMPLETE# appears on the display, check the following:

"A/B ch" indicated : Optimum offset value of DT driver circuit for A or B ch. is out of specification.
"C/D ch" indicated : Optimum offset value of DT driver circuit for C or D ch. is out of specification.

- Check the DT driver circuit (SS-88/DT-34C/ MB-863/DR-205A/HN boards, slip ring, wire harness, advance head and the like).
- Check the strain gauge signal detect system (advance head, DR-205A/SS-88/MB-863/ HN boards, slip ring, wire harness and the like).

F2 (SG LOOP) Key :

Performs checking to the feedback loop of the strain gauge.



(1) Press F2 key from DT/SAT CHECK menu to enter to SG LOOP menu.
(2) Press ∧ and ∨ keys. Checking to SG LOOP starts.
(3) When the checking normally completed, message CHECK COMPLETE appears on the display.

If message #CHECK INCOMPLETE# appears on the display, check the following:

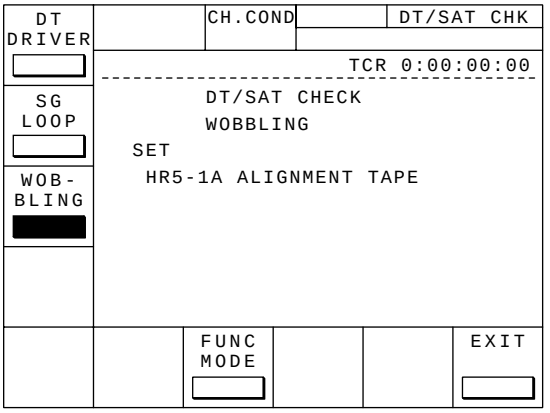
"A/B ch" indicated : Optimum bias value of the strain gauge amplifier circuit for A or B ch. is out of specification, or the value of strain gauge being distortion-erased is out of specification.

"C/D ch" indicated : Optimum bias value of the strain gauge amplifier circuit for C or D ch. is out of specification, or the value of strain gauge being distortion-erased is out of specification.

- Check the strain gauge signal detect system (advance head, DR-205A/SS-88/MB-863/ HN boards, slip ring, wire harness and the like).
- Check the DT driver system (SS-88/DT-34C/ DR-205A/MB-863/HN boards, slip ring, advance head, wire harness and the like).

F3 (WOBBLING) Key :

Performs checking to the tracking error detect circuit and to the wobbling voltage generator circuit.



(1) Press F3 key from DT/SAT CHECK menu to enter to WOBBLING menu.
(2) Set the alignment tape HR5-1A to the unit, and the unit automatically starts the checking.
During the process of checking, message CHECKING ..... continues to appear on the display.
(3) When the checking normally completed, message CHECK COMPLETE appears on the display.

If message #CHECK INCOMPLETE# appears on the display, check the following:

"A/B ch" indicated : During the process of checking, the output value of A or B ch of the tracking error detect circuit is out of specification, or wobbling function is not operated.
"C/D ch" indicated : During the process of checking, the output value of C or D ch of the tracking error detect circuit is out of specification, or wobbling function is not operated.

Note

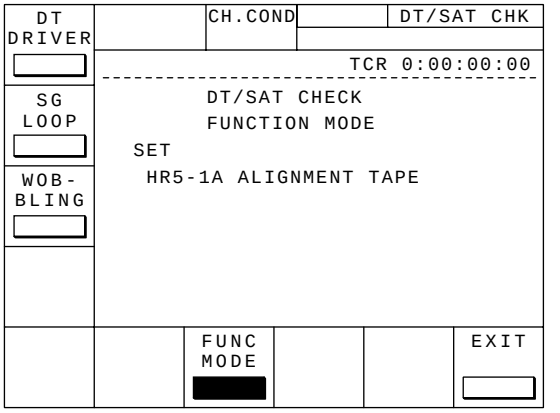
Tracking error detect circuit on SS-88 board is time-shared among A/B ch. and C/D ch.

"A/B ch. and C/D ch." indicated : Failed to achieve servo lock during adjustment.

- Check the tracking error detect circuit on SS-88 board.
- Check the wobbling voltage generator circuit on SS-88 board.
- Check the servo system.
- Check the RF playback system.
- Check the strain gauge signal detect system (advance head, DR-205A/MB-863/SS-88/ HN boards, slip ring, wire harness and the like).
- Check the DT driver system (SS-88/DT-34C/ MB-863/DR-205A boards, wire harness, slip ring, advance head and the like).
- If there is any possibility of miss-operation, perform this menu again.

F7 (FUNC MODE) Key :

Performs checking to SAT operation within its normal operating.



(1) Press F7 key from DT/SAT CHECK menu to enter to FUNC MODE menu.
(2) Set the alignment tape HR5-1A to the unit, and the unit automatically starts the checking.
During the process of checking, message CHECKING ..... appears on the display. The unit repeats PLAY and STOP for 8 times.
(3) When the checking normally completed, message CHECK COMPLETE appears on the display. The alignment tape is automatically ejected at the completion of checking.

If message #CHECK INCOMPLETE# appears on the display, check the following:

- If message #TIMING SIG TROUBLE# is indicated, check the timing signal processing circuit (IC1025) on SS-88 board. If no problem is detected, check the circuit in REC head playback (C ch.) system on EQ-85 board.
- If message #PILOT ENV TROUBLE# is indicated, check the RF envelope processing circuit (IC1023) on SS-88 board. If no problem is detected, check the circuit in REC head playback (A ch.) system on EQ-85 board.

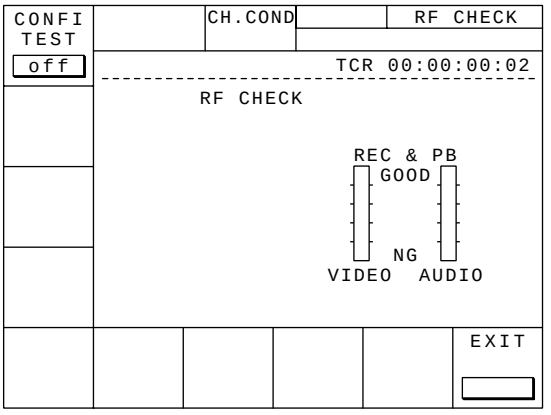
(4) Perform (1) to (3) with 3 kinds of modes, either of 23.976PsF or 24PsF and any of 50i, 59.94i or 60i.

4-3-4. RF SYSTEM Check (F7 : RF CHECK)

1. RF CHECK menu

Overview

This section is described RF CHECK menu.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

The indicators mean the error rate status of VIDEO and AUDIO signals.

F1 (CONFI TEST) Key :
on: Performs the forced playback of confidence head.
off: Follows to VTR status.

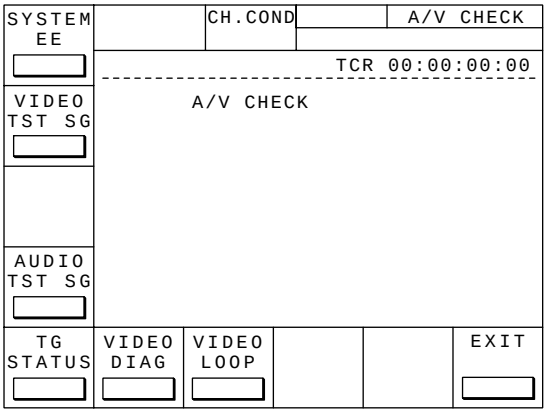
Note "on" is valid only in RF CHECK menu.

F10 (EXIT) Key :
Exits RF CHECK menu, and returns to MAINTENANCE menu.

4-3-5. AUDIO/VIDEO SYSTEM Check (F8 : A/V CHECK)

Overview

In this mode, you can set up the system E-E function during MAINTENANCE mode. In addition, you can set up the operation of audio and video test signal generators built in this unit.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

F1 (SYSTEM EE) Key :
Performs set up to enable/disable the system EE function during MAINTENANCE mode and to select the signal path when enabled the system EE function.

F2 (VIDEO TST SG) Key :
Selects operating mode of the internal video test signal generator during MAINTENANCE mode.

F4 (AUDIO TST SG) Key :
Selects operating mode of the internal audio test signal generator during MAINTENANCE mode.

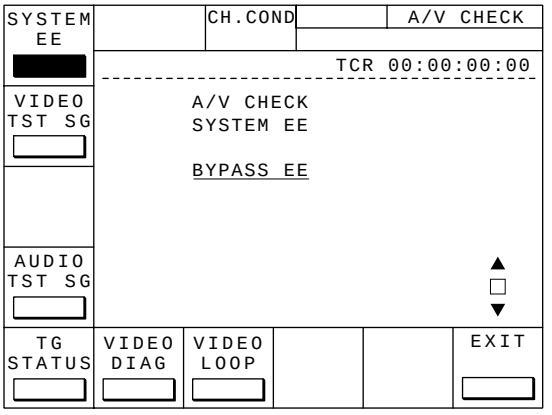
F5 (TG STATUS) Key :
Performs checking the status of TIMING GENERATOR.

F6 (VIDEO DIAG) Key :
Performs the self-diagnostics of video signal processing system.

F7 (VIDEO LOOP) Key :
Performs the loop-test of video signal processing system.

F10 (EXIT) Key :
Exits A/V CHECK menu, and returns to MAINTENANCE menu.

F1 (SYSTEM EE) Key :

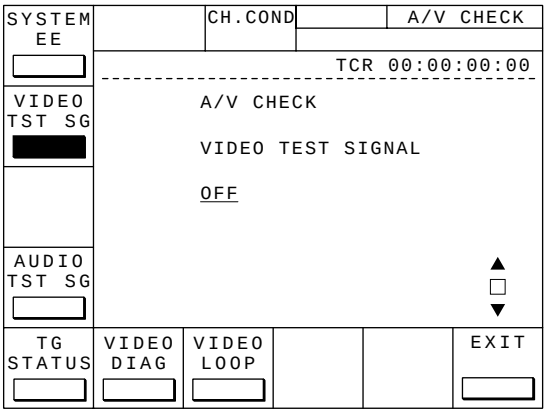


Performs set up to enable/disable the system EE function, and to select the signal path from the following options when enabled the system EE function.

BYPASS EE : Reflects the signal in DIF-91A board.
SYSTEM EE1 : Reflects the signal in ENCODER → DECODER section of BIT RATE REDUCTION circuit on DPR-143 board (AUDIO signal is reflected in BYPASS EE mode).
SYSTEM EE2 : Reflects the signal in ENCODER → DECODER (ADV) section of ERROR CORRECTION circuit on DPR-143 board.
SYSTEM EE3 : Reflects the signal in ENCODER → DECODER (CONFI) section of ERROR CORRECTION circuit on DPR-143 board.
SYSTEM EE4 : Reflects the signal in the recording signal input section on EQ-85 board (ADV system).
SYSTEM EE5 : Reflects the signal in the recording signal input section on EQ-85 board (CONFI system).
SYSTEM EE6 : Reflects the signal in EQ-85 board (ADV system).
SYSTEM EE7 : Reflects the signal in EQ-85 board (CONFI system).

(1) Press [∧] and [∨] keys to display the set up that you want.

F2 (VIDEO TST SG) Key :



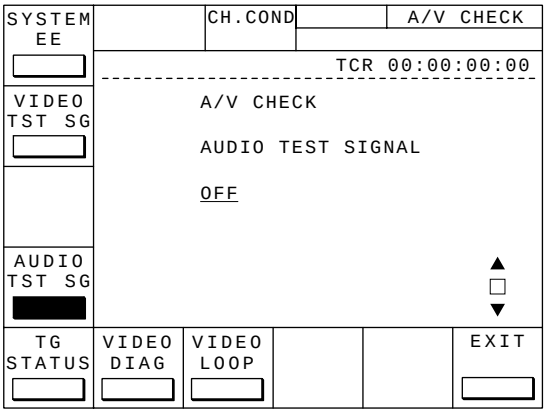
Selects the operation of internal video signal generator during MAINTENANCE mode.

OFF : Disables the video test signal generator.
other than OFF : COLOR BARS
MULTI BURST
10 STEPS
PULSE & BAR
RAMP
BLACK
PATHOLOGI (1)
PATHOLOGI (2)

(1) Press [∧] and [∨] keys to display the set up that you want.

F4 (AUDIO TST SG) Key :

Selects the operation of internal audio signal generator during MAINTENANCE mode.

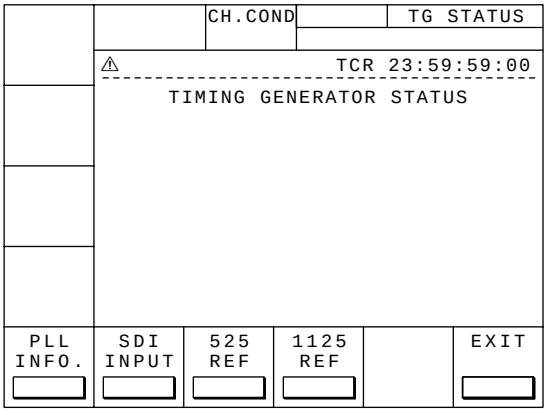


OFF : Disables the audio test signal generator.
other than OFF : Outputs the selected test signal from the audio test signal generator. (All of AUDIO INPUT SELECT buttons on the front panel light.)
silence
1 kHz SINE 0VU
1 kHz SINE BURST/1F
1 kHz SINE BURST/2F
1 kHz SINE BURST/5F
1 kHz SINE BURST/8F
1 kHz SINE BURST (10)
1 kHz SINE BURST (40)
SAW WAVE

(1) Press [∧] and [∨] keys to display the set up that you want.

F5 (TG STATUS) Key :

Performs checking the status of TIMING GENERATOR.



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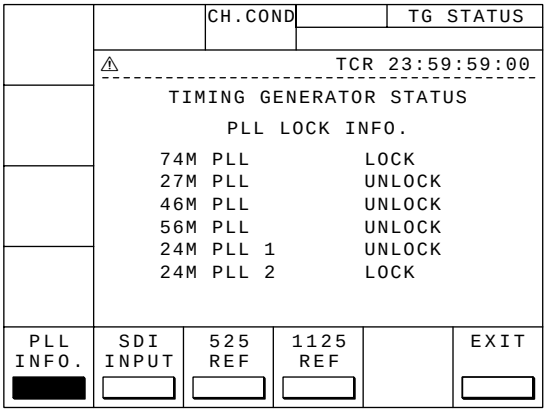
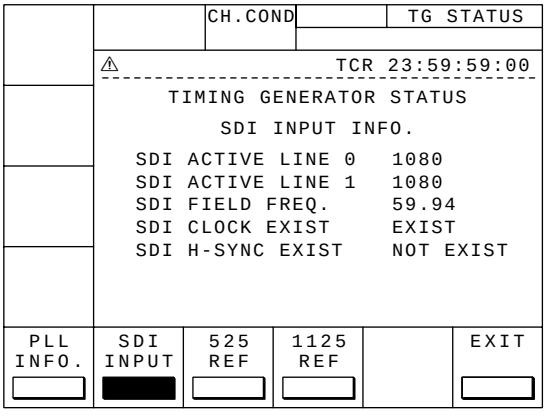
F5 (PLL INFO.) Key :

Displays the status of the lock on the PLL circuit of the VTR.



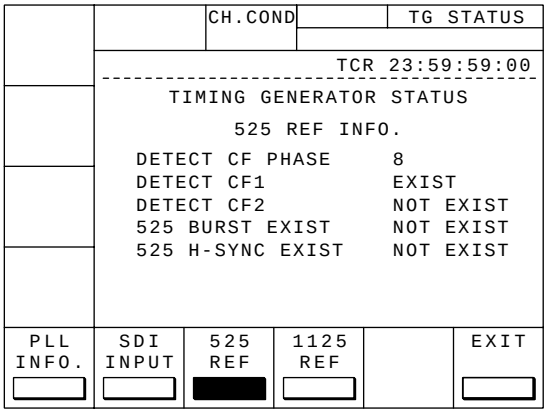
F6 (SDI INPUT) Key :

Displays the status of the HD SDI input signal.



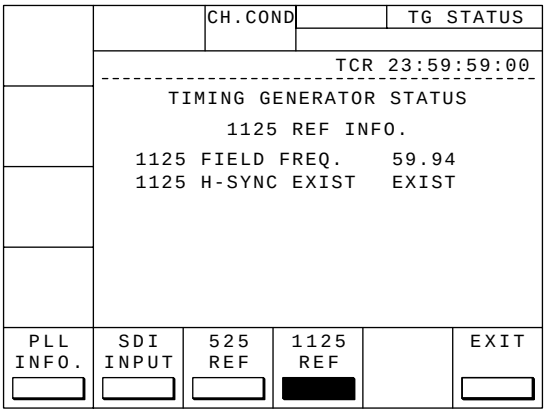
F7 (525 REF) Key :

Displays the status of the 525 REF input signal.



F8 (1125 REF) Key :

Displays the status of the 1125 REF input signal.



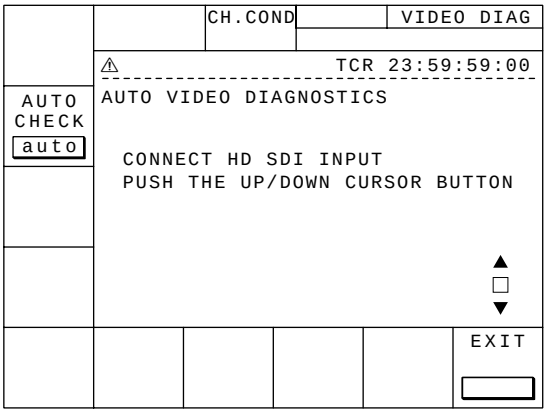
F6 (VIDEO DIAG) Key :

Performs the self-diagnostics of video signal processing system.

F2 (AUTO CHECK) Key :

Performs the self-diagnostics of the video signal processing system. Press F2 (AUTO CHECK) key to be selected the automatic or the manual of the self-diagnostics.

auto (setting at shipping from factory)
: Press ∧ and ∨ keys to start the self-diagnostics of the whole video signal processing system.
manual
: Press + and − keys to select the item, and press ∧ and ∨ keys to start the self-diagnostics.



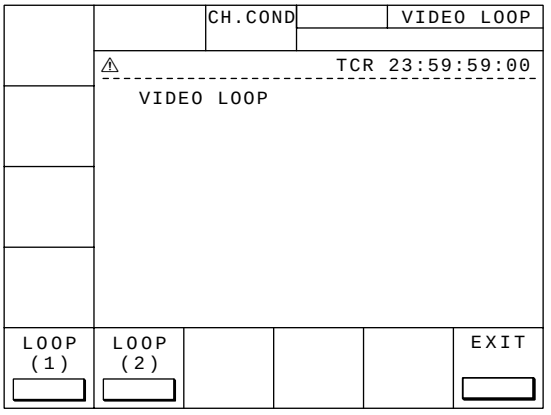
During the process of the self-diagnostics and when the self-diagnostics is completed, the following messages appear on the display.
- During the process of self-diagnostics
  : CHECKING.....
- When the self-diagnostics is normally completed
  : CHECK COMPLETE
- When the self-diagnostics is abnormally completed
  : CHECK INCOMPLETE

When the self-diagnostics is abnormally completed, the error message appears on the display.
(Example)
VIDEO DATA I/F ERROR
• • • Transmission error of VIDEO signal
SYNC I/F ERROR
• • • Transmission error of SYNC signal
EXT RAM I/F ERROR
• • • Signal's transmission error of external memory

Note
Perform this check in the status that the HD SDI INPUT is received a signal.

F7 (VIDEO LOOP) Key :

Performs the loop-test of video signal processing system.

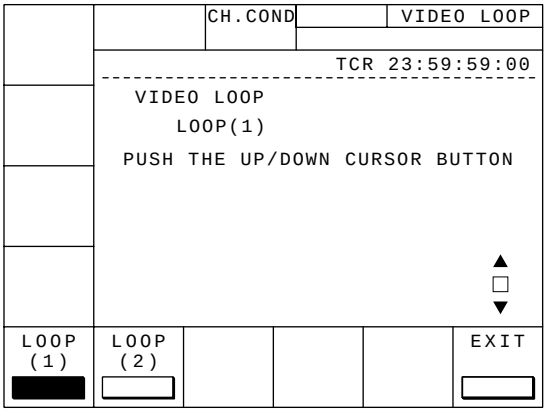


F5 (LOOP (1)) Key :

Performs the operation check of the looped video signal processing system.
Press [∧] and [∨] keys to start the loop operation.

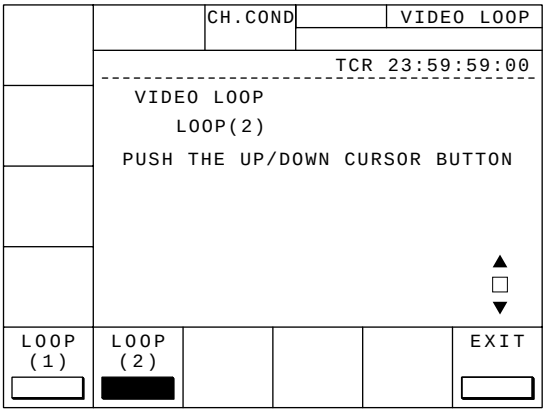
Note

After between HD SDI OUTPUT 1 and HD SDI INPUT is directly connected by a coaxial cable, perform this check.



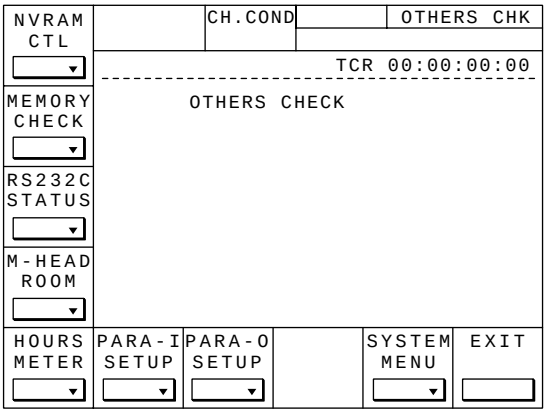
F6 (LOOP (2)) Key :

Performs the operation check of the looped video signal processing system in the FIELD EDIT.
Press [∧] and [∨] keys to start the loop operation.



4-3-6. OTHERS Check (F9 : OTHERS CHECK)

Overview



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

F1 (NVRAM CTL) Key :
Saves the cassette up data (function setup) of BKDW-509 into NVRAM, or resets it to the set up value at shipping from factory.

F3 (RS232C STATUS) Key :
Indicates the status of RS-232C. Also performs set up the flow control and the communication speeds necessary in ISR.

Note This is the menu for ISR. ISR (Interactive Status Reporting system) means the system to perform monitoring of operation and self-diagnostics of various broadcast devices from a PC using BZI-500/501 (ISR software).

F4 (M-HEAD ROOM) Key :
Performs set up the head room of audio level meter.

F5 (HOURS METER) Key :
Performs indication and reset of the resettable hours meters and the thread counter of this unit.

F6 (PARA-I SETUP) Key :
This is the menu for optional BKDW-509. Used to change the set up data (function set up of input pins of the parallel interface) of BKDW-509. Also indicates the logic level of the input pins.

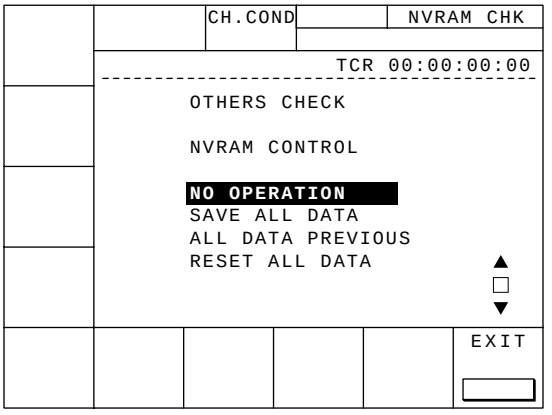
F7 (PARA-O SETUP) Key :
This is the menu for optional BKDW-509. Used to change the set up data (function set up of output pins of the parallel interface) of BKDW-509. Also indicates the logic level of the output pins.

F9 (SYSTEM MENU) Key :
Changes the operating mode of this unit.

F10 (EXIT) Key :
Exits OTHERS CHECK menu, and returns to MAINTENANCE menu.

F1 (NVRAM CTL) Key :

Saves the set up data (function setup) of BKDW-509 to a NVRAM.
Or, resets it to the set up data at shipping from factory.



Note

Once saved to NVRAM, the set up data does not return to it before change. If turned the power OFF without saving the set up data (function set up) after changed the set up in this menu, the set up data returns to it before change.

(1) Press [∧] and [∨] keys to select the condition of set up data (function setup).
   NO OPERATION : Performs no change to the set up data.
   SAVE ALL DATA : Saves the set up data after change.
   ALL DATA PREVIOUS : Returns to the set up data before change.
   RESET ALL DATA : Resets the set up data to it at shipping from factory.

(2) Press [F10] (EXIT) key. Transfer of the set up data starts.

F3 (RS232C STATUS) Key :

Indicates the status of RS-232C. Also, performs set up the flow control and the communication speeds necessary in ISR.

Note

This is the menu for ISR.

How to set up speeds (baud rate) / flow control:

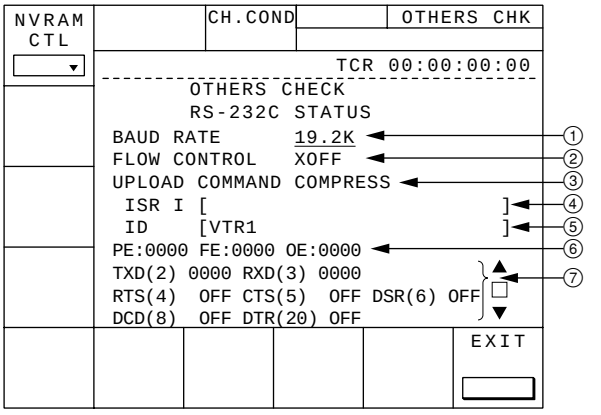
(1) Press ∧ and ∨ keys to move the cursor to the item that you want to change the set up.
(2) Use + and − keys to indicate the set up that you want.
(3) To save the set up data, press F1 key to enter to NVRAM CONTROL menu and execute SAVE ALL DATA command.
(4) Meanings of the indications are as follows:

① Select speeds from following five options:
1200, 2400, 4800, 9600, 19.2K (bps)

② Select and change the transmitter's flow control from following three options:
H/W : Flow control by hardware control.
XOFF : Flow control by XON/XOFF control.
H/W, XOFF: Flow control by combination of two control methods above.
Status indication of the protocol is as follows:

③ Select and change the upload command type from following two options:
UNCOMPRESS : normal data
COMPRESS : compressed data

④ ISR x [yyyy.....]
- Indicates the correctly received last command (The previous command is indicated until ACK transmission completed.).
- I : Idling (No data transfer performed.). Indicates the protocol status of this unit.
- A: Transmitting ACK
- N: Transmitting NAK
- T : Transmitting ATN (OPC or QRESP)
- W: Waiting ACK to be received
- X: XOFF received, waiting XON to be received.



⑤ The name set up by DEVID command in ISR protocol is indicated as device ID. This set up is held until it is changed by DEVID command (even if turned the power OFF).

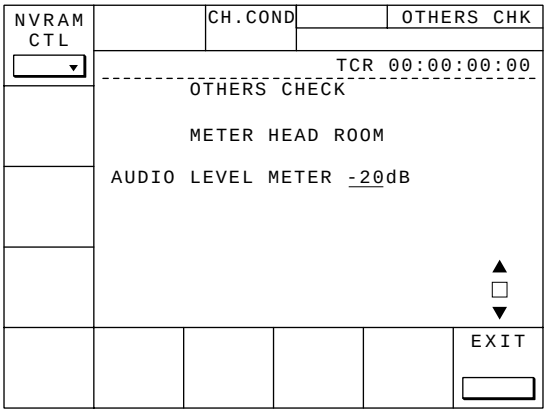
⑥ Times of occurrence of parity error (PE)/framing error (FE)/overrun error (OE) in received data are indicated in hexadecimal notation.

⑦ The number between ( ) shows the pin No. of RS-232C connector.
TXD/RXD indicates the number of bytes correctly transmitted/received by this unit.
Others data indicate the pin status of RS-232C connector in ON (≧+3 V)/OFF (≦−3 V) format. When the connector is correctly connected to a PC, all the pin status become ON. If nothing is connected to RS-232C connector, the status of input pins (CTS, DSR and DCD) becomes indefinite.

F4 (M-HEAD ROOM) Key :

Performs set up the head room of audio level meter from following options:

−20dB, −18dB

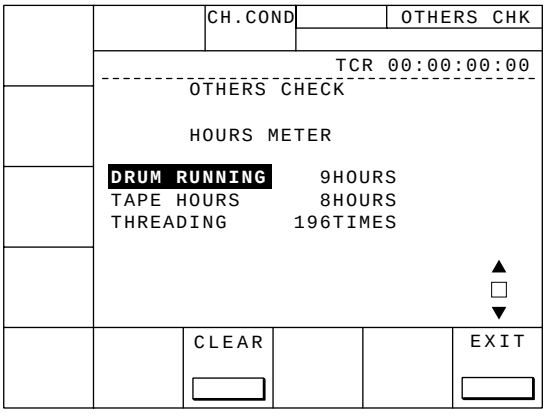


How to select the head room :

(1) Press ∧ and ∨ keys to indicate the set up that you want.
(2) To save the set up data, press F1 key to enter to NVRAM CONTROL menu and execute SAVE ALL DATA command.

F5 (HOURS METER) Key :

Performs indication and reset of the resettable hours meter and the thread counter of this unit.



Descriptions of indications

DRUM HOURS : Total time(s) of drum running
TAPE HOURS : Total time(s) of tape running
THREAD COUNTER : Total time(s) of tape threading

How to reset hours meter/thread counter

(1) Press ∧ and ∨ keys to move the cursor to the item that you want to reset.
(2) Press F7 (CLEAR) key while pressing SFT key to reset the indicated value.

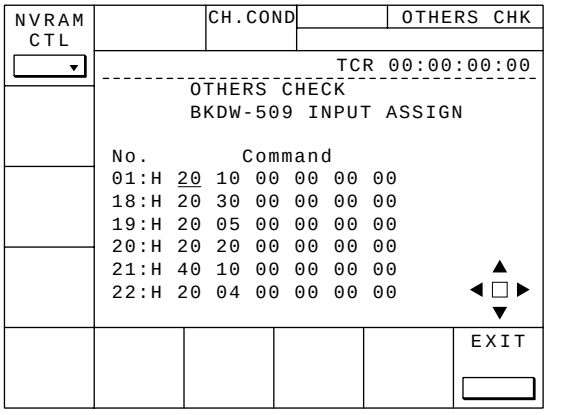
F6 (PARA-I SET UP) Key :

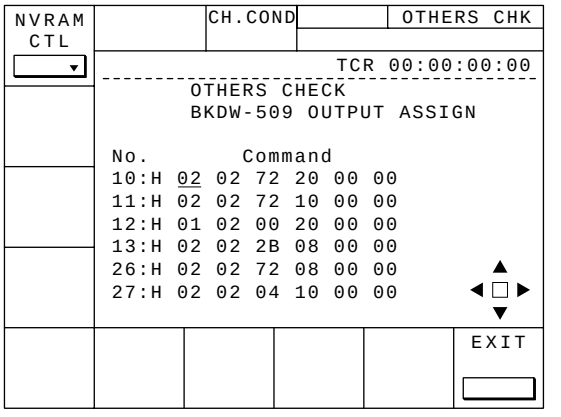
F7 (PARA-O SET UP) Key :

Changes the set up data (function set up of input or output pins of the parallel interface) of optional BKDW-509. Also indicates the logic level of input or output pins.

F6 (PARA-I SETUP) key is used to perform change of set up data and indication of logic levels of input pins.
F7 (PARA-O SETUP) key is used to perform change of set up data and indication of logic levels of output pins.
F1 (NVRAM CTL) key is used to save the set up data to NVRAM after the change, to restore the set up data before change, or to reset the set up data at shipping from factory.

"No. column" on the display indicates the pin number. Also, logic level of the input (or output) pin is indicated to the right of such pin No. in H (High) or L (Low) format.





Note

In actual change of the set up, reference to BKDW-509 interface manual is necessary.
Inadvertent change to the set up data may cause trouble. If you change the set up data inadvertently, press F1 key to enter to NVRAM CONTROL menu and execute ALL DATA PREVIOUS command. Or, turn the power OFF without executing NVRAM CONTROL command. Strictly avoid to execute SAVE ALL DATA command.

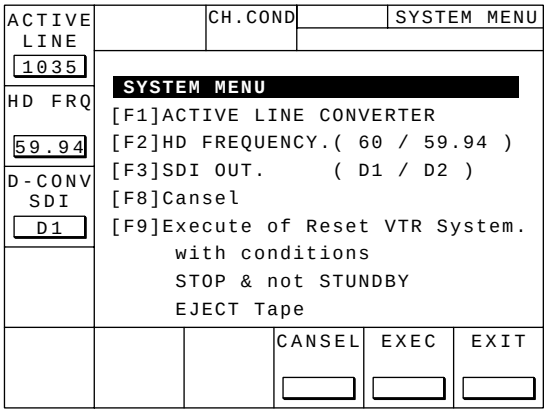
How to change the set up data :

(1) Select data of a pin No. that you want to change. Use ∧ and ∨ keys to move the cursor to the item that you want to change.
(2) Change the data.
Enter a new data with hexadecimal keys.
(3) After all the changes completed, press F10 (EXIT) key to return to MAINTENANCE menu.
(4) To save the set up data to NVRAM, press F1 key to execute NVRAM CONTROL command.

F9 (SYSTEM MENU) Key :

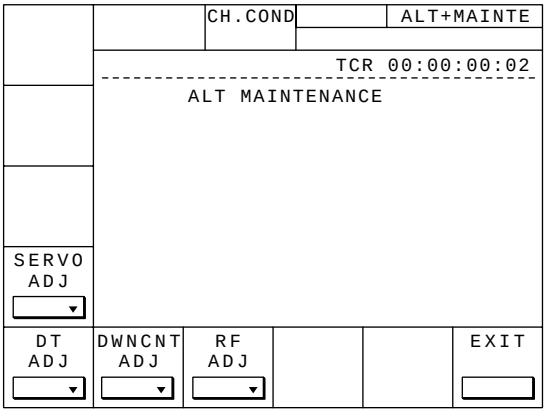
Changes the operating mode of this unit.

For details, refer to “Section 1-8. Switchable Functions” of this manual.



4-4. Alternative Maintenance Menu

Overview



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

Press [ALT] (Alternative) key from MAINTENANCE menu. ALT MAINTENANCE menu appears on the display.

[F4] (SERVO ADJ) Key :

Performs automatic or semi-automatic adjustment of servo system.

[F5] (DT ADJ) Key :

Performs automatic or semi-automatic adjustment of DT system.

[F6] (DWNCVT ADJ) Key :

Performs adjustment of DOWN CONVERTER system.

[F7] (RF ADJ) Key :

Performs automatic or semi-automatic adjustment of RF system.

[F10] (EXIT) Key :

Exits ALT MAINTENANCE menu, and returns to MAINTENANCE menu.

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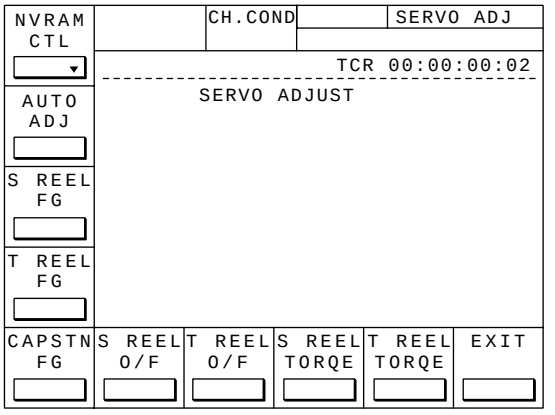
4-4-1. SERVO SYSTEM Adjustment (F4 : SERVO ADJ)

1. SERVO ADJUST menu

Overview

This section is described SERVO ADJUST menu.
Unless comment specified, same result is obtained with performing any of field frequency modes.

Note When pressed ALT key from SERVO ADJUST menu, it transits to ALT+SERVO ADJUST menu.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

F1 (NVRAM CTL) Key :
Saves the adjustment data of servo system to NVRAM.

F2 (AUTO ADJ) Key :
Pressing this key from F3 (S REEL FG) menu performs automatic adjustment of menus in F9 (T REEL TORQUE) and menus in F3 (TENSION OFFSET) of ALT+SERVO ADJUST menu.

F3 (S REEL FG) Key :
Performs duty adjustment of S reel FG.

F4 (T REEL FG) Key:
Performs duty adjustment of T reel FG.

F5 (CAPSTN FG) Key :
Performs duty adjustment of capstan FG.

F6 (S REEL O/F) Key :
Performs offset and friction adjustments of S reel.

F7 (T REEL O/F) Key :
Performs offset and friction adjustments of T reel.

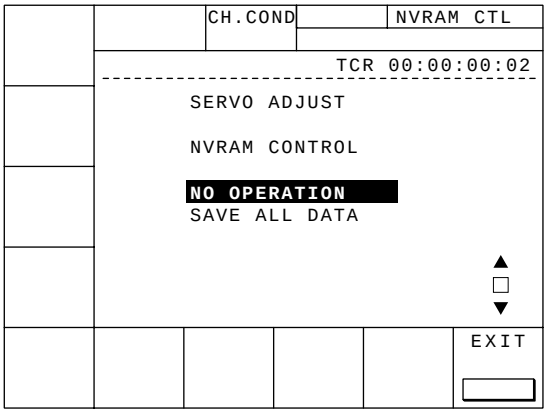
F8 (S REEL TORQUE) Key :
Performs torque adjustment of S reel.

F9 (T REEL TORQUE) Key :
Performs torque adjustment of T reel.

F10 (EXIT) Key :
Exits SERVO ADJUST menu, and returns to ALT MAINTENANCE menu.

F1 (NVRAM CTL) Key :

Saves the adjustment data of servo system to NVRAM.



Note

Perform this adjustment while a cassette tape is ejected out from the unit. If the cassette tape is loaded in the unit when selected this menu, the cassette tape is automatically ejected.

(1) Press F1 key from SERVO ADJUST menu to enter to NVRAM CONTROL menu.
(2) Press ∧ and ∨ keys to select SAVE ALL DATA. (When selected, it is indicated in "white characters on black background" mode.)
(3) Press F10 (EXIT) key. Transfer of data starts. On the display, message "NVRAM WRITING....." continues to appear.
(4) When data transfer completed, the message above disappears.

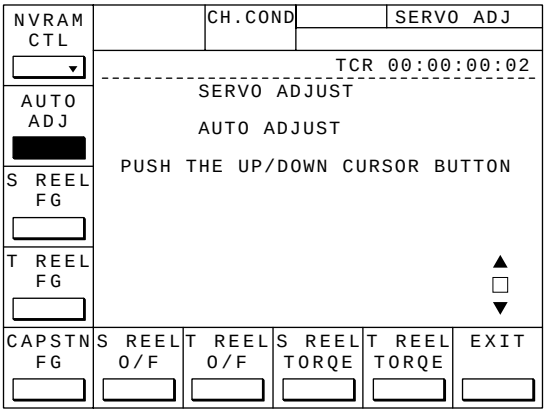
Note

If turned the power OFF without saving the adjustment data to NVRAM after the adjustment, the adjustment data of servo system restores to the data just before the adjustment.

F2 (AUTO ADJ) Key :

Sequentially performs automatic adjustments to following menus.

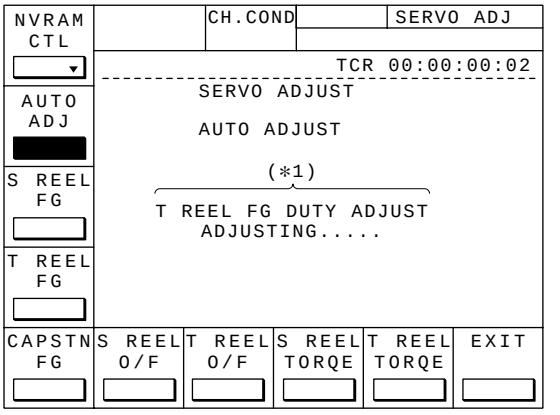
1. F3 : S REEL FG DUTY ADJUST
2. F4 : T REEL FG DUTY ADJUST
3. F5 : CAPSTAN FG DUTY ADJUST
4. F6 : S REEL OFFSET/FRICTION
5. F7 : T REEL OFFSET/FRICTION
6. F8 : S REEL TORQUE ADJUST
7. F9 : T REEL TORQUE ADJUST
8. F3 : S/T TENSION OFFSET ADJUST



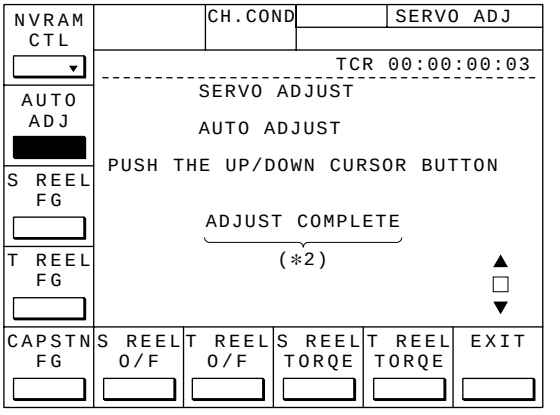
Note

If you want to perform individual REEL adjustment, perform the adjustment in the order listed above.
Also, perform REEL adjustment above when a cassette tape ejected from the unit. If the cassette tape is loaded in the unit when selected this menu, the cassette tape is automatically ejected.

(1) Press F2 key from SERVO ADJUST menu to enter to AUTO ADJUST menu.
(2) Press ∧ and ∨ keys to start the adjustment. Perform the adjustment starting from S REEL FG DUTY ADJUST. During adjustment, message ADJUSTING .... continues to appear on the display. The current adjustment item is indicated in the area marked with (∗1) on the display.
(3) When all the adjustments normally completed, message ADJUST COMPLETE appears in the area marked with (∗2) on the display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.



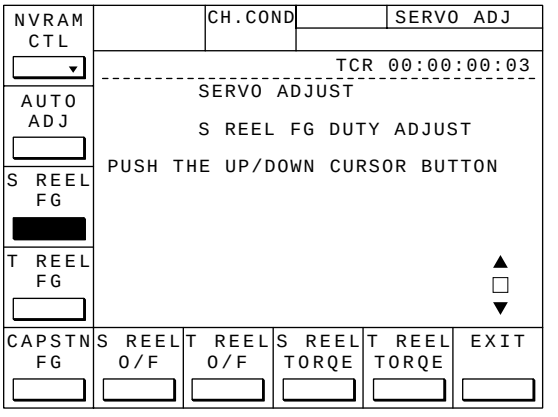
If message ADJUST INCOMPLETE appears in the area marked with (∗2) on the display, check the adjustment menus.



F3 (S REEL FG) Key:

Performs duty adjustment of S reel FG.

(1) Press F3 key from SERVO ADJUST menu to enter to S REEL FG DUTY ADJUST menu.
(2) Press ∧ and ∨ keys to start the adjustment. During adjustment, message ADJUSTING .... continues to appear on the display.
(3) When all the adjustments normally completed, message ADJUST COMPLETE appears on display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.

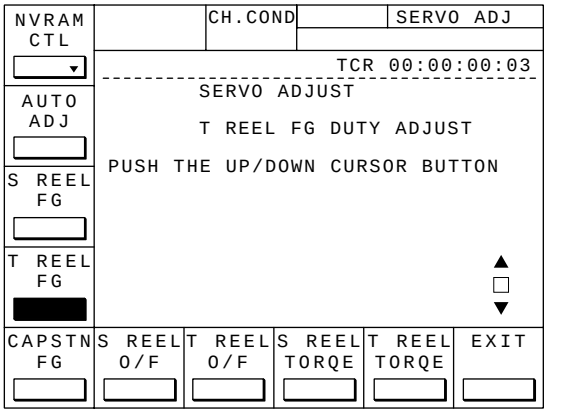


If message ADJUST INCOMPLETE appears on the display, check the following:

- Check S reel FG amp circuit and S reel motor driver circuit on DR-307 board.

F4 (T REEL FG) Key :

Performs duty adjustment of T reel FG.



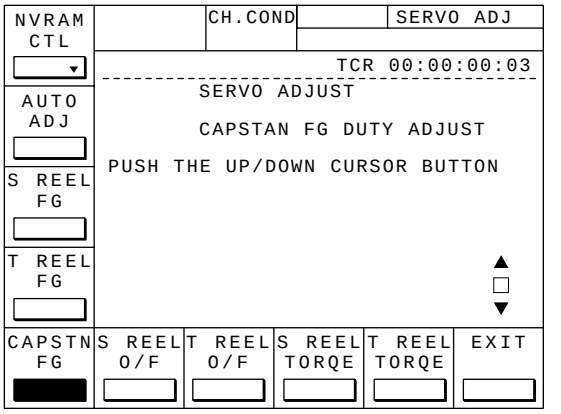
(1) Press F4 key from SERVO ADJUST menu to enter to T REEL FG DUTY ADJUST menu.
(2) Press ∧ and ∨ keys to start the adjustment. During adjustment, message ADJUSTING .... continues to appear on the display.
(3) After all the adjustments normally completed, message ADJUST COMPLETE appears on the display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.

If message ADJUST INCOMPLETE appears on the display, check the following:

- Check T reel FG amp circuit and T reel motor driver circuit on DR-307 board.

F5 (CAPSTN FG) Key :

Performs duty adjustment of capstan FG.



(1) Press F5 key from SERVO ADJUST menu to enter to CAPSTAN FG DUTY ADJUST menu.
(2) Press ∧ and ∨ keys to start the adjustment. During adjustment, message ADJUSTING .... continues to appear on the display.
(3) After all the adjustments normally completed, message ADJUST COMPLETE appears on the display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.

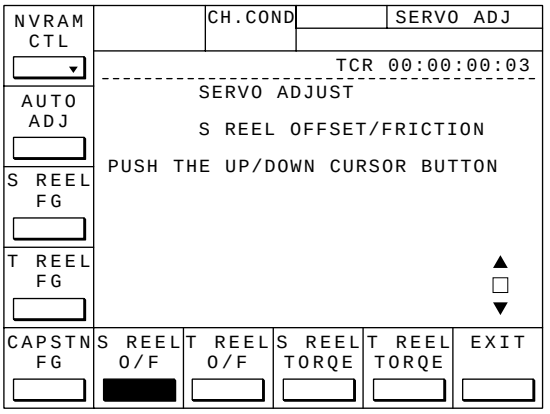
If message ADJUST INCOMPLETE appears on the display, check the following:

- Check capstan FG amp circuit and capstan motor driver circuit on DR-307 board.

F6 (S REEL O/F) Key :

Performs S reel offset and friction adjustments.

(1) Press F6 key from SERVO ADJUST menu to enter to S REEL OFFSET/FRICTION menu.
(2) Press ∧ and ∨ keys to start the adjustment. During the process of adjustment, message ADJUSTING .... continues to appear on the display.
(3) After the adjustment normally completed, message ADJUST COMPLETE appears on the display.
(4) To save the adjustment data to NVRAM, press F6 key to execute NVRAM CONTROL command.



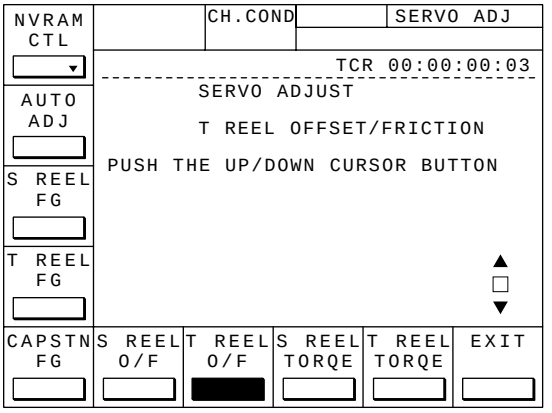
If message ADJUST INCOMPLETE appears on the display, check the following :

- Perform S reel FG duty adjustment (S REEL FG DUTY ADJUST) again and check S reel motor driver circuit on DR-307 board.

F7 (T REEL O/F) Key :

Performs T reel offset and friction adjustments.

(1) Press F7 key from SERVO ADJUST menu to enter to T REEL OFFSET/FRICTION ADJUST menu.
(2) Press ∧ and ∨ keys to start the adjustment. During the process of adjustment, message ADJUSTING .... continues to appear on the display.
(3) After the adjustment normally completed, message ADJUST COMPLETE appears on the display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.

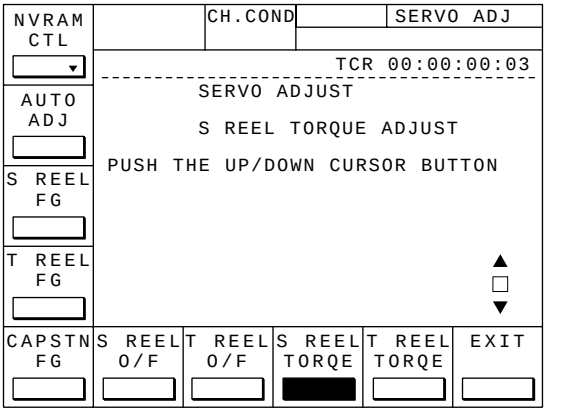


If message ADJUST INCOMPLETE appears on the display, check the following:

- Perform T reel FG duty adjustment (T REEL FG DUTY ADJUST) again and check T reel motor driver circuit on DR-307 board.

F8 (S REEL TORQUE) Key :

Performs S reel torque adjustment.



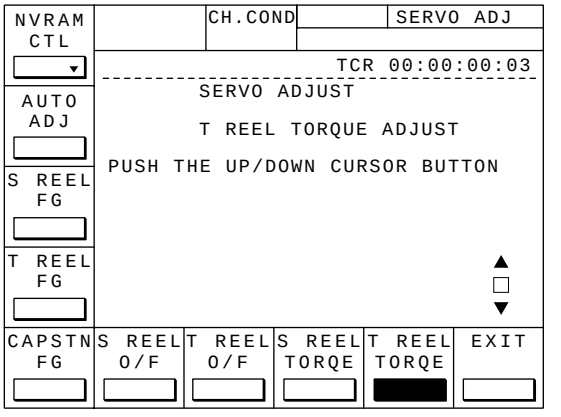
(1) Press F8 key from SERVO ADJUST menu to enter to S REEL TORQUE ADJUST menu.
(2) Press ∧ and ∨ keys to start the adjustment. During the process of adjustment, message ADJUSTING .... continues to appear on the display.
(3) After the adjustment normally completed, message ADJUST COMPLETE appears on the display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.

If message ADJUST INCOMPLETE appears on the display, check the following:

- Perform S reel FG duty adjustment (S REEL FG DUTY ADJUST) again and check S reel motor driver circuit on DR-307 board.

F9 (T REEL TORQUE) Key :

Performs T reel torque adjustment.



(1) Press F9 key from SERVO ADJUST menu to enter to T REEL TORQUE ADJUST menu.
(2) Press ∧ and ∨ keys to start the adjustment. During the process of adjustment, message ADJUSTING .... continues to appear on the display.
(3) After the adjustment normally completed, message ADJUST COMPLETE appears on the display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.

If message ADJUST INCOMPLETE appears on the display, check the following:

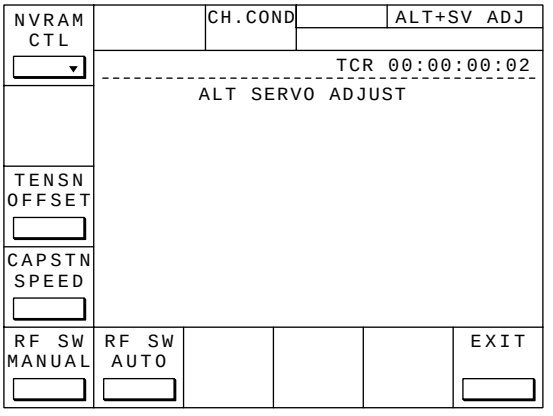
- Perform T reel FG duty adjustment (T REEL FG DUTY ADJUST) again and check T reel motor driver circuit on DR-307 board.

2. ALT+SERVO ADJUST menu

Overview

This section is described ALT+SERVO ADJUST menu.
To enter to ALT+SERVO ADJUST menu, press [ALT] key from SERVO ADJUST menu.

Note If pressed [ALT] key from ALT+SERVO ADJUST menu, it transits to SERVO ADJUST menu.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

[F1] (NVRAM CTL) Key :
Saves the adjustment data of servo system to NVRAM.

[F3] (TENSN OFFSET) Key :
Performs offset adjustments of S and T tension regulators.

[F4] (CAPSTN SPPED) Key :
Performs free-run speed adjustment of capstan motor.

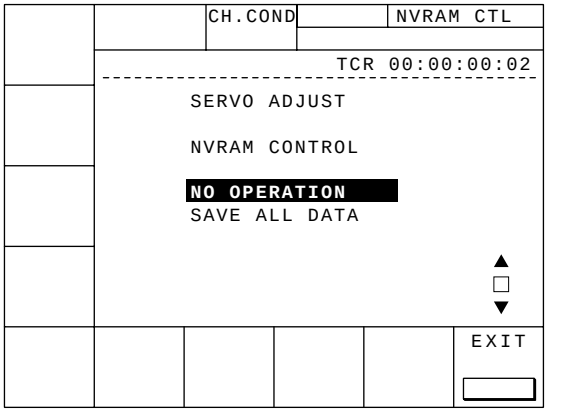
[F5] (RF SW MANUAL) Key :
Performs manual adjustment of RF switching position.

[F6] (RF SW AUTO) Key :
Performs automatic adjustment of RF switching position.

[F10] (EXIT) Key :
Exits ALT+SERVO ADJUST menu, and returns to ALT MAINTENANCE menu.

F1 (NVRAM CONTROL) Key :

Saves the adjustment data of servo system to NVRAM.



Note

Perform this menu while a cassette tape is ejected from the unit. If the cassette tape is loaded to the unit when selected this menu, the cassette tape is automatically ejected.

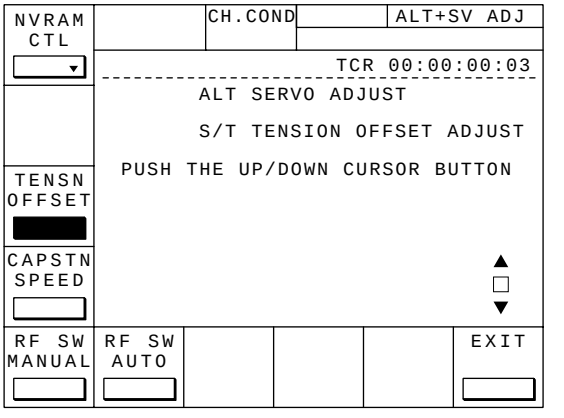
(1) Press F1 key from ALT+SERVO ADJUST menu to enter to NVRAM CONTROL menu.
(2) Use ∧ and ∨ keys to select SAVE ALL DATA. (When selected, it is indicated in "white characters on black background" mode.)
(3) Press F10 (EXIT) key, and data transfer starts. During the process of data transfer, message NVRAM WRITING.... continues to appear on the display.
(4) When the data transfer completed, the message above disappears.

Note

If turned the power OFF without saving the adjustment data to NVRAM, the adjustment data of servo system returns to it just before the adjustment.

F3 (TENSN OFFSET) Key:

Performs offset adjustments of S and T tension regulators.



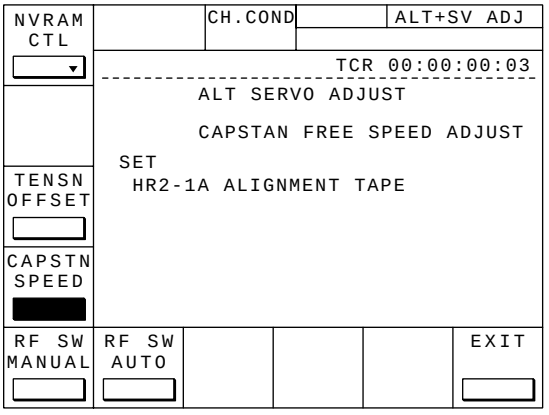
(1) Press F2 key from ALT+SERVO ADJ menu to enter to S/T TENSION OFFSET ADJUST menu.
(2) Press ∧ and ∨ keys to start the adjustment. During the process of adjustment, message ADJUSTING .... continues to appear on the display.
(3) After the adjustment normally completed, message ADJUST COMPLETE appears on the display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.

If message ADJUST INCOMPLETE appears on the display, check the following:

- Check S reel tension detect circuit (IC40) or T tension detect circuit (IC32) on DR-307 board.

F4 (CAPSTN SPEED) Key :

Performs free-run speed adjustment of capstan motor.



Note

If a cassette tape is loaded to the unit when selected this menu, the cassette tape is automatically ejected from the unit. The adjustment starts by loading the cassette tape to the unit again.

(1) Press F4 key from ALT+SERVO ADJUST menu to enter to CAPSTAN SPEED ADJUST menu.
(2) Set the alignment tape HR2-1A to the unit, and the unit automatically starts the adjustment. During the process of adjustment, message ADJUSTING ..... continues to appear on the display.

Note

Ensure to use the alignment tape HR2-1A. If message ADJUST COMPLETE is indicated on the display after the adjustment completed using an alignment tape other than above, you can not achieve the correct adjustment.

(3) When the adjustment normally completed, message ADJUST COMPLETE appears on the display. The alignment tape is automatically ejected.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.

If message “ADJUST INCOMPLETE” appears on the display, check the following:

- Check that the playback tape is the alignment tape HR2-1A.
- Check capstan FG amp circuit, capstan motor driver circuit and CTL amp circuit on DR-307 board.

F5 (RF SW MANUAL) Key :

Performs manual adjustment of RF switching position. This adjustment is used when automatic adjustment (F6 RF SW AUTO) is impossible to perform because of some reason.

Note

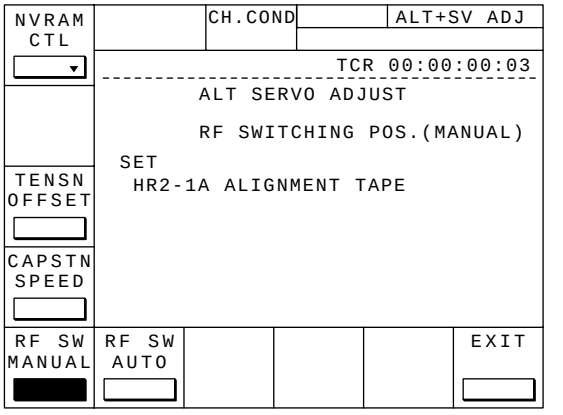
Adjustment value of the field frequency differ 59.94i/60i from 50i, moreover 23.976PsF/24PsF.
Be ensure to perform adjustment on each modes.
Besides, had better perform either of 59.94i or 60i and either of 23.976PsF or 24PsF.

Before starting this adjustment, cue up the alignment tape HR2-1A to the portion on which only A ch. is recorded from the tape top where CTL counter starts count-up operation.

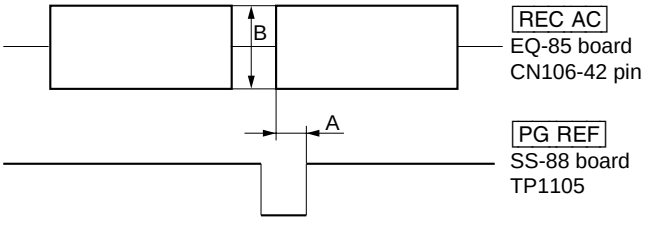
Note

If a cassette tape is loaded to the unit when selected this menu, the cassette tape is automatically ejected from the unit. The adjustment starts by loading the cassette tape to the unit again.

(1) Connect CH-1 probe of an oscilloscope to CN106-42 pin REC AC on EQ-85 board.
(2) Connect CH-4 probe to TP1105 PG REF on SS-88 board.
(3) Press F5 key from ALT+SERVO ADJUST menu to enter to RF SWITCHING POS. (MANUAL) menu.
(4) Set the alignment tape HR2-1A to the unit. The unit automatically enters to PLAY mode. During the process of adjustment, message ADJUSTING.... continues to appear on the display.
Note
Be ensure to use the alignment tape HR2-1A.
(5) Press S1000 REEL POS switch on SS-88 board and check that D1011 VR ON lights.
(6) Turn RV1000 TRACON on SS-88 board so that B becomes the maximum amplitude.
(Refer to the illustration below.)



(7) Use ∧ and ∨ keys to change the adjustment data so that A meets the specification.
(Refer to the illustration below.)



Specification : A = 0 ± 2 [µsec]

□+∧ keys : Adjusts the data by +100H.
□+∨ keys : Adjusts the data by −100H.
∧ key only : Adjusts the data by +1H.
∨ key only : Adjusts the data by −1H.

(8) Repeat steps (6) and (7) above until both A and B meet the specification.
(9) To end the adjustment, press F1 (NVRAM CTL) key or F10 (EXIT) key.
The alignment tape is automatically ejected.
Besides, use the EX-579/580 extension board for measurement CN106-42 pin on EQ-85 board.

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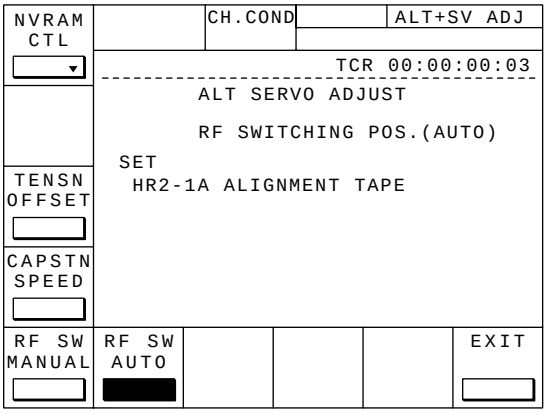
F6 (RF SW AUTO) Key :

Performs automatic adjustment of RF switching position.



Note

Adjustment value of the field frequency differ 59.94i/60i from 50i, moreover 23.976PsF/24PsF.
Be ensure to perform adjustment on each modes.
Besides, had better perform either of 59.94i or 60i and either of 23.976PsF or 24PsF.

Before starting this adjustment, cue up the alignment tape HR2-1A to the portion on which only A ch. is recorded from the tape top where CTL counter starts count-up operation.

Note

If a cassette tape is loaded to the unit when selected this menu, the cassette tape is automatically ejected from the unit. The adjustment starts by loading the cassette tape to the unit again.

(1) Press F6 key from ALT+SERVO ADJUST menu to enter to RF SWITCHING POS. (AUTO) menu.
(2) Set the alignment tape HR2-1A to the unit. The unit automatically starts the adjustment. During the process of adjustment, message ADJUSTING.... continues to appear on the display.

    Note

    Be ensure to use the alignment tape HR2-1A. If message ADJUST COMPLETE is indicated on the display after the adjustment completed using an alignment tape other than above, you can not achieve the correct adjustment.
(3) When the adjustment normally completed, message ADJUST COMPLETE appears on the display. The alignment tape is automatically ejected.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CONTROL command.
(5) Press F10 (EXIT) key to end the adjustment.

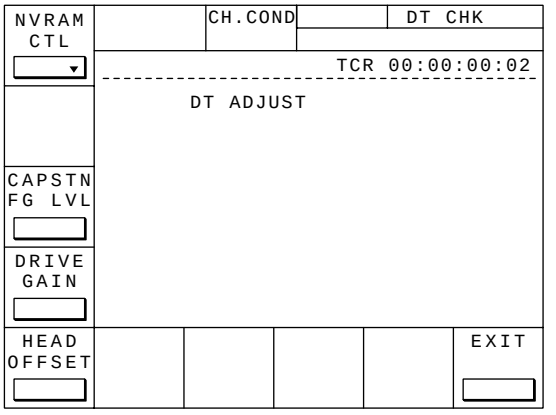
If message #ADJUST INCOMPLETE# appears on the display, check the following:

- Press F5 key to execute RF SWITCHING POS. (MANUAL) command for manual adjustment of RF switching position. Execute SAT FUNCTION MODE command from SERVO CHECK menu.

4-4-2. DT SYSTEM Adjustment (F5 : DT ADJ)

Overview

Performs automatic or semi-automatic adjustment of DT system.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

F1 (NVRAM CTL) Key :
Saves the adjustment data of DT system to NVRAM.

F3 (CAPSTN FG LVL) Key :
Measures analog voltage of capstan FG.

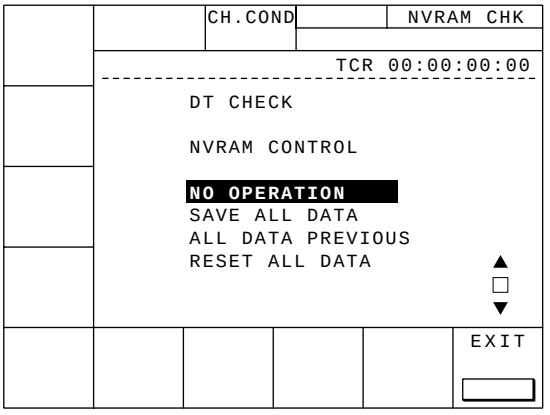
F4 (DRIVE GAIN) Key :
Measures the proportional constant between strain gauge voltage and actual head height, and the response time between bimorph drive voltage and strain gauge voltage.

F5 (HEAD OFFSET) Key :
Measures the bimorph drive voltage at the reference height of DT head, and checks DT lock status.

F10 (EXIT) Key :
Exits DT ADJUST menu, and returns to ALT MAINTENANCE menu.

F1 (NVRAM CTL) Key :

Saves the adjustment data of DT system to NVRAM.



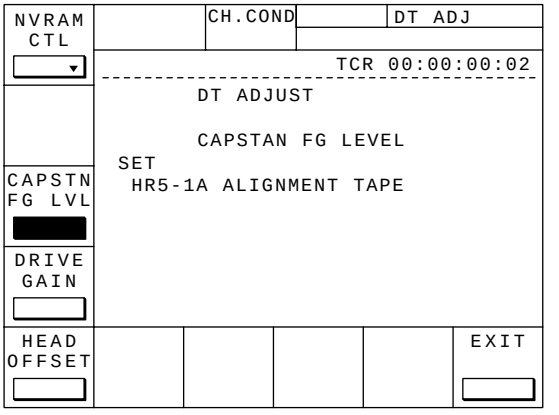
Note

Once saved to NVRAM, the set up data does not return to it before change. If turned the power OFF without saving the adjustment data after changed the set up, the adjustment data of DT system returns to it before change.

(1) Press F1 key from DT ADJUST menu to enter to NVRAM CONTROL menu.
(2) Use ∧ and ∨ keys to select the condition of adjustment data:
   NO OPERATION : Performs no adjustment.
   SAVE ALL DATA : Saves the adjustment data on RAM to NVRAM. Select this adjustment under normal condition.
   ALL DATA PREVIOUS : Re-loads the lastly written data to NVRAM from NVRAM to RAM.
   RESET ALL DATA : Loads the initial data written in the ROM to RAM. Data in the RAM is the same data when turned the power ON while pressing DT-INIT switch.
(3) Press F10 (EXIT) key. Transfer of adjustment data starts.

F3 (CAPSTAN FG LVL) Key :

Measures the maximum and the minimum value of analog voltage of capstan FG necessary in the detection of minute rotational phase of the capstan. Using the value, the unit continuously performs the conversion of the analog voltage of capstan FG to the rotational phase.

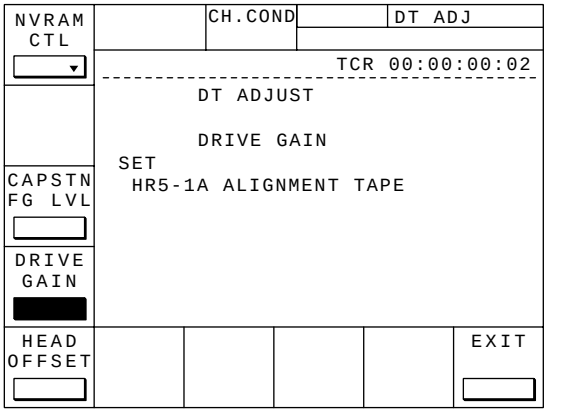


(1) Press F3 key from DT ADJUST menu to enter to CAPSTAN FG LEVEL menu.
(2) Set the alignment tape HR5-1A to the unit. The unit automatically starts the adjustment. During the process of adjustment, message ADJUSTING.... continues to appear on the display.
(3) When the adjustment normally completed, message ADJUST COMPLETE appears on the control panel display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CTL command.
(5) Press F10 (EXIT) key to end the adjustment. Also, the alignment tape is automatically ejected.

When message #ADJUST INCOMPLETE# appears on the display, check the following:
(The maximum and the minimum voltages of capstan FG amp (on DR-307 board) is out of specification, or the unit failed to achieve servo lock when the adjustment.)

- Check the capstan FG amp (on DR-307 board).
- Check the SS-88 board.
- Check the capstan motor.
- Check the servo system.
- Check the alignment tape HR5-1A.
- If there is a possibility of miss-operation, perform re-adjustment.

F4 (DRIVE GAIN) Key :



Measures the proportional constant (gain) between strain gauge voltage and actual height of DT head. Also, measures the response time (DELAY) of the bimorph drive voltage to the voltage acquired from the strain gauge.

(1) Press F4 key from DT ADJUST menu to enter to DRIVE GAIN menu.
(2) Set the alignment tape HR5-1A to the unit. The unit automatically starts the adjustment. During the process of adjustment, message ADJUSTING.... continues to appear on the display and the unit enters to PLAY mode.
(3) When the adjustment normally completed, message ADJUST COMPLETE appears on the display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CTL command.
(5) Press F10 (EXIT) key to end the adjustment. The alignment tape is automatically ejected.

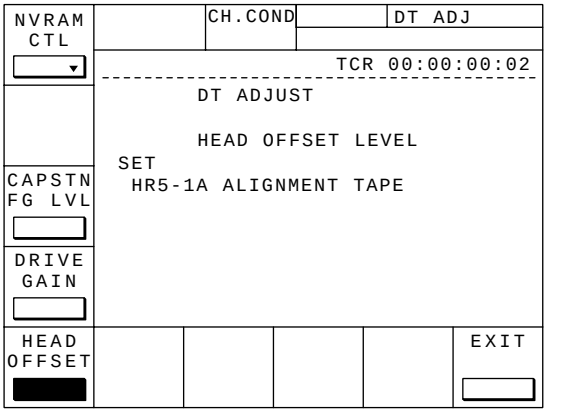
When message #ADJUST INCOMPLETE# appeared on the display, check the following:

Indicated GAIN (A/B-ch) : Gain value measured on A and B ch. is out of specification.
Indicated GAIN (C/D-ch) : Gain value measured on C and D ch. is out of specification.
Indicated DELAY (A/B-ch) : Delay times measured on A and B ch. are out of specification.
Indicated DELAY (C/D-ch) : Delay times measured on C end D ch. are out of specification.

- Check the strain gauge signal detect system (advance head, DR-205A/SS-88/MB-863/ HN boards, slip ring, wire harness and the like).
- Check the DT driver system (SS-88/DT-34C/ MB-863/DR-205A/HN boards, slip ring, wire harness, advance head and the like).
- Check the RF playback system.
- Check the alignment tape HR5-1A.
- If there is any possibility of miss-operation, perform re-adjustment.

F5 (HEAD OFFSET) Key :

Measures the bimorph drive voltage with reference to the tape when the DT head is located at its reference position. Checks that the unit is continuously trace the correct track (DT Lock) by the segment signal acquired from the processor playback system.



(1) Press F5 key from DT ADJUST menu to enter to HEAD OFFSET LEVEL menu.
(2) Set the alignment tape HR5-1A to the unit. The unit automatically starts the adjustment. During the process of adjustment, message ADJUSTING.... continues to appear on the display and the unit enters to PLAY mode.
(3) When the adjustment normally completed, message ADJUST COMPLETE appears on the display.
(4) To save the adjustment data to NVRAM, press F1 key to execute NVRAM CTL command.
(5) Press F10 (EXIT) key to end the adjustment. The alignment tape is automatically ejected.

If message #ADJUST INCOMPLETE# appeared on the display, check the following:

Indicated A/B-ch : Bimorph drive voltage on A and B-ch. is out of specification, or the unit failed to achieve DT Lock on A and B-ch.

Indicated C/D-ch : Bimorph drive voltage on C and D-ch. is out of specification, or the unit failed to achieve DT Lock on C and D-ch.

Indicated A/B-ch C/D-ch : The unit failed to achieve servo lock when adjustment.

- Check the strain gauge signal detect system (advance head, DR-205A/MB-863/HN board, slip ring, wire harness and the like).
- Check the DT driver system (SS-88/DT-34C/ MB-863/DR-205A/HN boards, wire harness, slip ring, advance head and the like).
- Check the segment signal playback system (processor playback system, MB-863/SS-88 boards and the like).
- Check the servo system.
- Check the alignment tape HR5-1A.
- If there is any possibility of miss-operation, perform re-adjustment.

4-4-3. RF SYSTEM Adjustment (F7 : RF ADJUST)

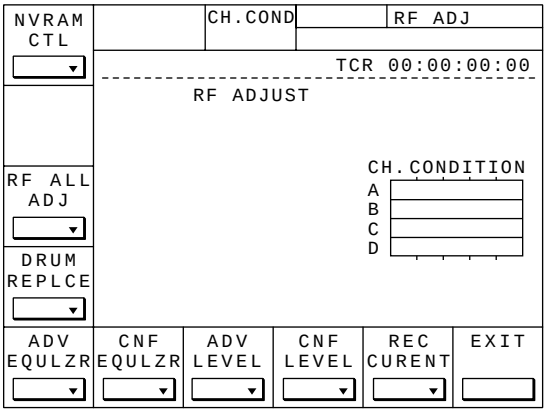
1. RF ADJUST menu

Overview

This section is described RF ADJUST menu.

Note Adjustment value of the RF system differ in each field frequency 59.94i/60i from 50i, moreover 23.976PsF/24PsF, therefore be sure to perform adjustment in each mode.
Besides, had better perform either of 59.94i or 60i and either of 23.976PsF or 24PsF.

Note If pressed ALT key from RF ADJUST menu, the menu transits to ALT+RF ADJUST menu.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

F1 (NVRAM CTL) Key :
Saves the adjustment data of RF system to NVRAM. Or, restores the adjustment data to it just before the adjustment.

Note Once saved to NVRAM, the set up data does not return to it before change. If turned the power OFF without saving the adjustment data after changed the set up, the adjustment data returns to it before change.

F3 (RF ALL ADJ) Key :
Performs automatic adjustment of all the adjustment items necessary in RF adjustment.

F4 (DRUM REPLCE) Key :
Performs automatic adjustment of all the adjustment items necessary when replaced the head drum.

F5 (ADV EQULZR) Key :
Performs gain and phase adjustment of playback equalizer circuit of advance head.

F6 (CNF EQULZR) Key :
Performs gain and phase adjustment of playback equalizer circuit of confidence head.

F7 (ADV LEVEL) Key:
Performs adjustment of RF playback level of advance head.

F8 (CNF LEVEL) Key:
Performs adjustment of RF playback level of confidence head.

F9 (REC CURRENT) Key:
Performs adjustment of recording current of recording heads.

F10 (EXIT) Key:
Exits RF ADJUST menu, and returns to ALT MAINTENANCE menu.

Preparations

1. Adjustment of playback system
   Prepare the alignment tape HR5-1A which cued up to 00:00:00:00.
2. Adjustment of recording system
   Prepare a HD tape for recording.

Description of adjustment items

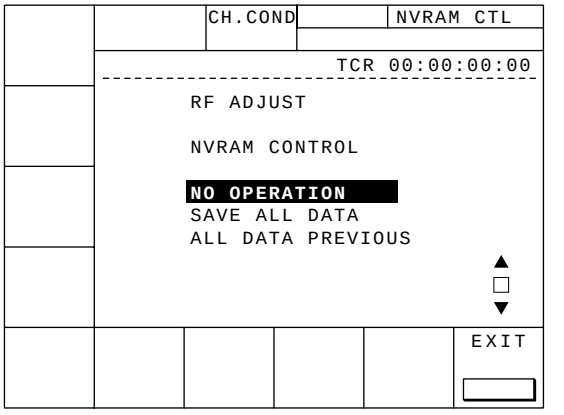
F1 (NVRAM CTL) Key :

Saves the adjustment data of RF system to NVRAM. Or, restores the adjustment data of RF system to it just before the adjustment without saving it to NVRAM.

Note

Once saved to NVRAM, the adjustment data is not returned to it before change.

(1) Press F1 key from RF CHECK menu to enter to NVRAM CONTROL menu.
(2) Use ∧ and ∨ keys to select the item that you want. (When selected, it is indicated in "white characters on black background" mode.)
   NO OPERATION : Performs no adjustment.
   SAVE ALL DATA : Saves the data after adjustment.
   ALL DATA PREVIOUS : Restores data to it before adjustment.
(3) Press F10 (EXIT) key. Data transfer starts.
   Following message appears on the display:
   When executed SAVE ALL DATA;
      NVRAM WRITING.....
   When executed ALL DATA PREVIOUS;
      PREVIOUS DATA READING



(4) After data transfer completed, NVRAM CTL menu returns to the previous RF ADJUST menu.

Note

1. If the data transfer failed, following message appears on the display ;
   NVRAM ACCESS ERROR!!
   PUSH CURSOR KEY
2. If the data transfer is successful, data transfer completes within the period shown below ;
   When executed SAVE ALL DATA : about 3 seconds
   When executed ALL DATA PREVIOUS : about 1 second

Note

Once saved to NVRAM, the set up data does not return to it before change.
If turned the power OFF without saving the adjustment data after changed the set up, RF adjustment data returns to it before change.

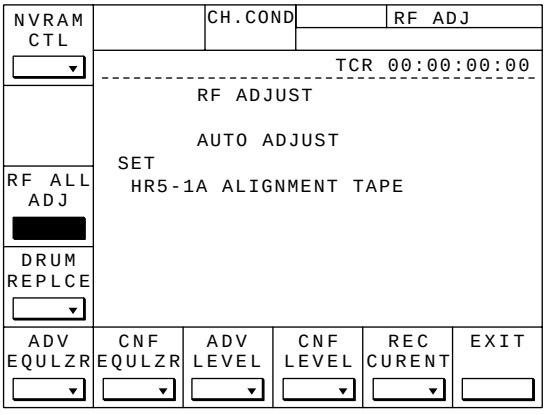
F3 (RF ALL ADJ) Key :

Automatically and sequentially executes all the adjustment menus necessary in RF adjustment in the order listed below.

1. The unit requests insertion of the alignment tape HR5-1A.
2. F5 : PLAY PLL (ALT+RF ADJUST menu)
3. F6 : SHTLE FWD PLL (ALT+RF ADJUST menu)
4. The unit rewinds the alignment tape.
5. F7 : ADV LEVEL
6. F8 : CNF LEVEL
7. F5 : ADV EQULZR
8. F6 : CNF EQULZR
9. F7 : ADV LEVEL
10. F8 : CNF LEVEL
11. F4 : V REF (ALT+RF ADJUST menu)

Menus above are for adjustment of playback system.

12. The unit requests to replace the alignment tape with a recording tape.
13. F9 : REC CURRENT



(1) Press F3 key from RF CHECK menu to enter to AUTO ADJUST menu.

(2) On the display, message SET HR5-1A ALIGNMENT TAPE appears requesting the operator to insert the alignment tape HR5-1A to the unit. Insert the alignment tape HR5-1A to the unit.

Note

Rewind the alignment tape HR5-1A to its tape top beforehand or rewind the tape after it is inserted.

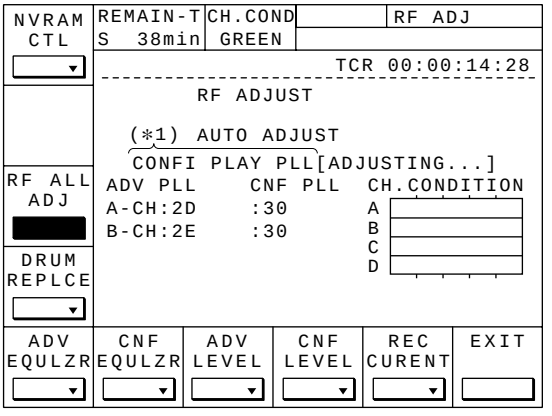
(3) When inserted the alignment tape to the unit, message PUSH THE UP/DOWN CURSOR KEY appears on the display. Press ∧ and ∨ keys to start the adjustment.

At every adjustment item, the area marked with (∗1) on the display changes.

(4) When all the adjustments of playback system completed, the unit automatically ejects the alignment tape HR5-1A. The unit indicates a message SET BLANK TAPE requesting to insert a recording tape. Insert the tape for recording.

Note

Rewind the recording tape beforehand or rewind the tape after loaded it to the unit to allow recording for more than 3 minutes.



Note

If RF ALL ADJ is executed, turn TIMER SEL of TC to CTL beforehand.

(5) Insert the recording tape to the unit. The unit automatically enters to REC mode, and starts adjustment of REC current.

Note

1. If the unit stepped out of the condition necessary in performing correct adjustment (tape running stopped, for example) during adjustment (playback/recording), following message appears on the panel display and the adjustment is interrupted.
   "Adjustment Item" [#INCOMPLETE#]
   ERROR : CONDITION
2. If failed to achieve correct adjustment after started the adjustment, following message appears on the display:
   "Adjustment Item" [#INCOMPLETE#]
   ERROR : 01001000
   (∗1)

   (∗1) : The number indicates the status of channels from left to right :
   Ach, Bch, Cch, Dch (ADV head) Ach, Bch, Cch, Dch (CONFI head)
   0 : Channel on which the adjustment is successful.
   1 : Channel on which the adjustment is unsuccessful.

(6) When all the adjustment normally completed, message ADJUST COMPLETE appears on the display.

(7) To save the adjustment data to NVRAM, execute F1 NVRAM CTL command.

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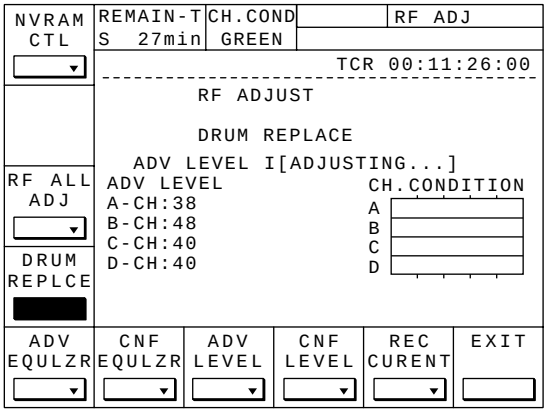
F4 (DRUM REPLCE) Key :



Automatically and sequentially executes all the adjustment menus necessary when replaced the head drum in the order listed below.

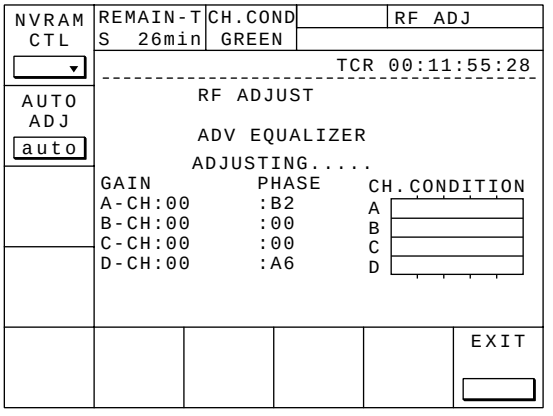
1. The unit requests to insert the alignment tape HR5-1A.
2. F7 : ADV LEVEL
3. F8 : CNF LEVEL
4. F5 : ADV EQULZR
5. F6 : CNF EQULZR
6. F7 : ADV LEVEL
7. F8 : CNF LEVEL
8. F4 : V REF (ALT+RF ADJUST menu)

Menus above are the adjustments for playback system.

9. The unit requests to replace the alignment tape with a recording tape.
10. F4: REC CURRENT

This adjustment is the same with F3 RF ALL ADJ excluding F5 PLAY PLL (ALT+RF ADJUST menu) and F6 SHTLE FWD PLL (ALT+RF ADJUST menu) from it.

F5 (ADV EQULZR) Key:



Performs adjustment of gain and phase of playback equalizer circuit of advance head. You can select either manual or automatic adjustment.

1. Automatic adjustment

(1) Press F5 key from RF CHECK menu to enter to ADV EQUALZE menu.
(2) Press F2 (manual/auto switching) key and select "auto". (When entered to an adjustment menu, "auto" is selected as default.)
(3) The unit indicates a message SET HR5-1A ALIGNMENT TAPE requesting to insert the alignment tape HR5-1A to the unit. Insert the alignment tape to the unit.

Note

Rewind alignment tape beforehand or rewind it after insertion to the unit.

(4) When inserted the tape to the unit, message PUSH THE UP/DOWN CURSOR KEY appears on the display. Press ∧ and ∨ keys to start the adjustment. During the process of adjustment, message ADJUSTING.... appears on the lower portion of the display.
(5) When the adjustment normally completed, message ADJUST COMPLETE appears on the lower portion of the display.
(6) To save adjustment data to NVRAM, execute F1 NVRAM CTL command.
(7) Press F10 (EXIT) key to return to RF ADJUST menu.

2. Manual adjustment

(1) Press [F5] key from RF CHECK menu to enter to ADV EQUALZE menu.
(2) Press [F2] (manual/auto switching) key to select "manual". (When entered to a menu, "auto" is selected as default.) GAIN A-CH data is underlined. (The underlined data is the data being adjusted.)
(3) Use [∧], [∨], [<] and [>] keys to move the underline to the channel that you want to adjust.
(4) Use [+] and [−] keys in combination with [SFT] key to change the data :
Press [+] key. : The data increases by + 1.
Press [−] key. : The data decreases by − 1.
Press [+] key while pressing [SFT] key. : The data increases by + 4.
Press [−] key while pressing [SFT] key. : The data decreases by − 4.
(5) Repeat steps (3) and (4) above on other channels.
(6) To save the adjustment data to NVRAM, execute [F1] NVRAM CTL command.
(7) Press [F10] (EXIT) key to return to RF ADJUST menu.

Note

During manual adjustment, keys such as PLAY located on the front panel are valid and you can perform any VTR operation by these keys.

[F6] (CNF EQULZR) Key:
[F7] (ADV LEVEL) Key:
[F8] (CNF LEVEL) Key:
[F9] (REC CURRENT) Key:

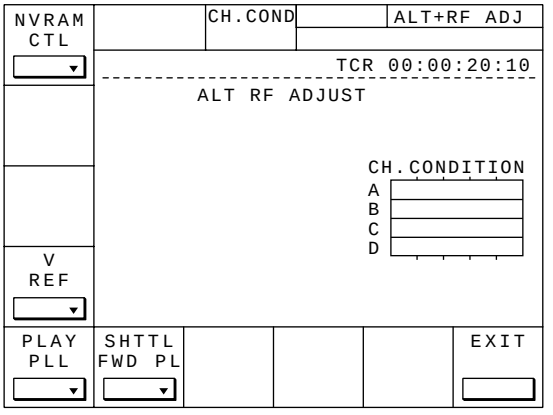
Adjustment procedures of playback system [F6] CNF EQULZR, [F7] ADV LEVEL and [F8] CNF LEVEL are the same with those of [F5] ADV EQULZR.
Adjustment procedure of recording system ([F9] REC CURRENT) is the same with that of [F5] ADV EQULZR excluding a recording tape is required in place of the alignment tape HR5-1A.

2. ALT+RF ADJUST menu

Overview

This section is described ALT+RF ADJUST menu. To enter to ALT+RF ADJUST menu, press [ALT] key from RF ADJUST menu.

Note If pressed [ALT] key from ALT+RF ADJUST menu, it returns to RF ADJUST menu.



Note Actual typefaces differ from the ones shown in diagrams in this manual. Also, the content of diagram are only one example of many.

[F1] (NVRAM CTL) Key :

Saves the adjustment data of RF system to NVRAM. Or, restores the data to it before the adjustment.

Note Once saved to NVRAM, the set up data does not return to it before change. If turned the power OFF without saving the adjustment data after changed the set up, the adjustment data returns to it before change.

[F4] (V REF) Key :

Performs adjustment of A/D reference voltage.

[F5] (PLAY PLL) Key :

Performs adjustment of VCO free-run frequency of playback PLL circuit in PLAY mode.

[F6] (SHTLE FWD PL) Key :

Performs adjustment of VCO free-run frequency of playback PLL circuit in SHUTTLE FWD mode.

[F10] (EXIT) Key :

Exits ALT+RF ADJUST menu, and returns to MAINTENANCE menu.

Preparations

1. Adjustment of playback system
   Prepare the alignment tape HR5-1A which cued up to 00:00:00:00.
2. Adjustment of recording system
   Prepare a HD tape for recording.

Description of adjustment items

F1 (NVRAM CTL) Key :

Saves the adjustment data of RF system to NVRAM. Or, restores the adjustment data of RF system to it before adjustment without saving it to NVRAM.

Note

Once saved to NVRAM, the adjustment data does not return to it before change.

(1) Press F1 key from ALT+RF CHECK menu to enter to NVRAM CONTROL menu.
Press ∧ and ∨ keys to select the adjustment item. (When selected, the adjustment item is indicated in "white characters on black background" mode.) Select SAVE ALL DATA to save the adjustment data after the adjustment completed, or select "ALL DATA PREVIOUS" to restore the adjustment data to it before adjustment.

(2) Press F10 (EXIT) key to start the data transfer.
When executed SAVE ALL DATA, message NVRAM WRITING.... appears on the display. When executed ALL DATA PREVIOUIS, message PREVIOUS DATA READING appears on the display.

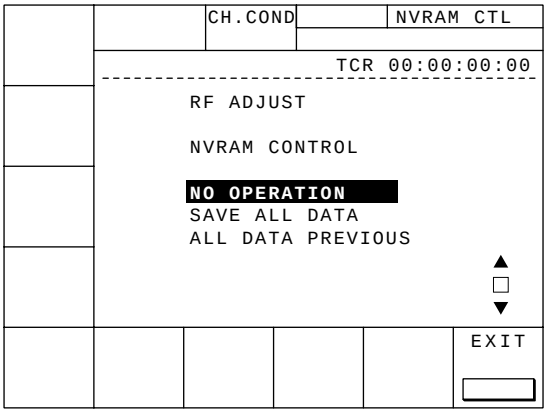
(3) When the data transfer completed, the menu returns to the previous RF ADJUST Menu.

Note

1. If the unit failed normal transfer of data, message NVRAM ACCESS ERROR!! PUSH CURSOR KEY appears in both cases.
2. When the data transfer is successful, SAVE ALL DATA process completes within about 3 seconds and ALL DATA PREVIOUS process completes within about 1 second.

Note

Once saved to NVRAM, the set up data does not return to it before change. If turned the power OFF without saving the adjustment data after changed the set up, the adjustment data returns to it before change.



F4 (S REEL O/F) Key :
F5 (PLAY PLL) Key :
F6 (SHTLE FWD PL) Key :

Adjustment procedures of playback system F4 V REF, F5 PLAY PLL and F6 SHTLE FWD PL are the same with those of F5 ADV EQULZR (RF CHECK menu).

Section 5
Periodic Maintenance and Inspection

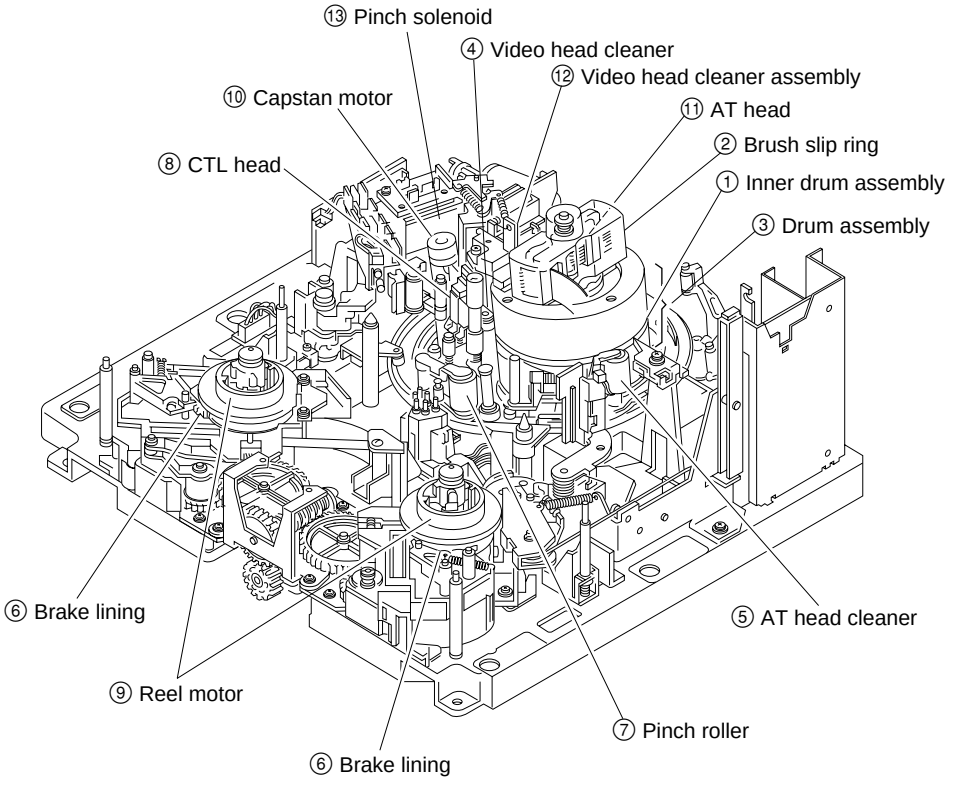
This section describes how to carry out periodic inspections and cleaning.

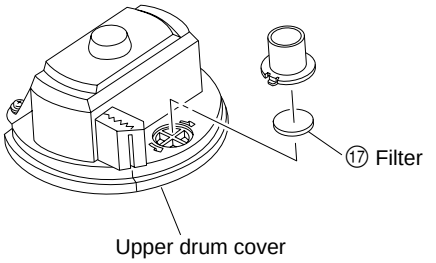
5-1. Periodic Inspection

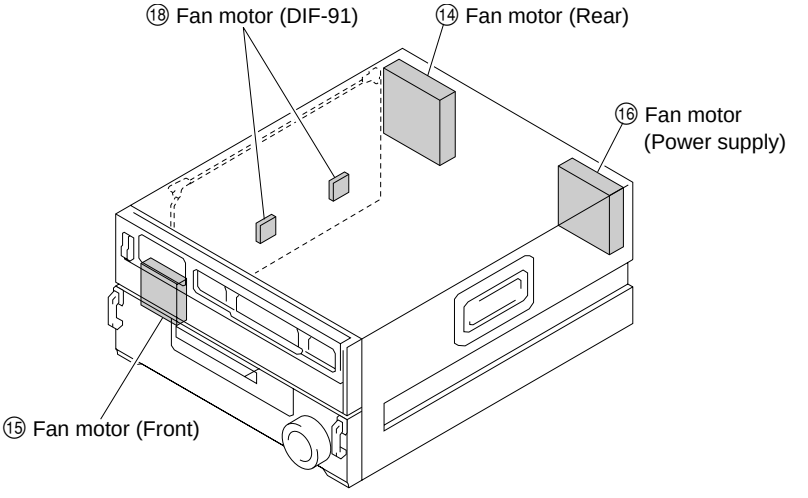
To make the most of the functions, fully realize the performance of the unit, periodically check parts and replace them.

5-1-1. Index

The following parts must be periodically inspected and replaced.
The numbers in the illustration correspond to the table on the next page.







5-1-2. Periodic Replacement List

The replacement time which show in the following list are not the guarantee term parts. Use this list as guidelines for the maintenance and inspection. The replacement time of the parts vary depending on the operation environment and conditions of the unit. In particular, the pinch roller and cleaners may need to be replaced earlier than the replacement period indicated, according to the degree of wear and dirt.

No.	Replacement Parts	Replacement Interval	Part No.	Part Name	Qty.	Remarks
1	Inner drum assembly	Every 1,000 hours of drum rotation	A-8313-765-A	Inner drum assembly DHR-03-R	1	
2	Brush/slip ring	Every 3,000 hours of drum rotation	A-8267-572-A	Brush SR9 assembly (RP)	1	
3	Drum assembly (*1)	Every 3,000 hours of drum rotation	A-8313-763-A	Drum assembly DHH-03A-R	1	
4	Video head cleaner	Every 1,000 hours of drum rotation	A-8320-546-A	V cleaning roller (B) assembly	1	
			3-182-765-02	CR spacer	1	
5	AT head cleaner	Every 1,000 hours of drum rotation	X-3167-053-2	CL arm assembly	1	
6	Brake lining	Every 3,000 hours of tape running	X-3717-205-1	Lining assembly	2	
7	Pinch roller	Every 1,000 hours of tape running	X-3167-054-4	Pinch arm assembly	1	
8	CTL head	Every 3,000 hours of tape running	8-825-554-84	CTL head (PS244-21B)	1	
9	Reel motor	Every 3,000 hours of tape running	A-8267-774-E	RM assembly	2	
10	Capstan motor	Every 3,000 hours of tape running	1-698-179-12	DC motor (Capstan)	1	
11	AT head	Every 6,000 hours of tape running	8-825-778-23	Audio head (EPS244-2103G)	1	Inspect every 3,000 hours
12	Video head cleaner assembly (*2)	Every 3,000 hours of drum rotation	A-8320-545-A	Video head cleaner (B) assembly	1	
13	Pinch solenoid	The earlier one: 6000 hours of tape running or 200,000 times of threading	1-454-338-00	Plunger solenoid	1	
14	Fan motor (Rear)	Every 10,000 hours of power ON time	1-541-431-41	DC fan (80 square)	1	
15	Fan motor (Front)	Every 40,000 hours of power ON time	1-698-857-11	DC fan (60 square)	1	
16	Fan motor (Power supply)	Every 10,000 hours of power ON time	1-541-431-41	DC fan (80 square)	1	
17	Filter of upper drum cover	Every 1,000 hours of drum rotation	3-182-649-01	Filter	1	
18	Fan motor (DIF-91)	Every 10,000 hours of power ON time	1-763-037-12	DC fan (25 square)	2	

(*1): The drum assembly includes the Inner drum assembly and brush slip ring.
(*2): The video head cleaner assembly includes the video head cleaner.

If threading/unthreading are repeated frequently, periodic replacement of the following parts is recommended.

Replacement Parts	Replacement Interval	Part No.	Part Name	Qty.
Brake solenoid	Every 200,000 times of threading	1-454-417-41	Plunger solenoid	2
S tension regulator	Every 200,000 times of threading	A-8267-795-E	Tension regulator assembly (RP)	1
T tension regulator	Every 200,000 times of threading	A-8267-423-C	T TEN assembly	1
T drawer arm assembly	Every 200,000 times of threading	A-8274-876-D	T drawer assembly	1
Gear box assembly	Every 200,000 times of threading	A-8267-424-A	Gear BOX assembly	1
Threading ring assembly	Every 200,000 times of threading	A-8267-395-F	Threading ring assembly	1
Ring roller	Every 200,000 times of threading	3-180-677-01	Ring roller	2
		3-180-679-01	Ring roller B	1
Pinch arm guide	Every 200,000 times of threading	3-180-853-01	Pinch arm guard	1
CL guide rail	Every 200,000 times of threading	3-180-874-02	CL guide rail	1
Cassette compartment assembly	Every 200,000 times of threading	A-8267-589-F	Cassette compartment (RP)	1

5-1-3. Hours Meter

This unit displays an hours meter on its SET-UP screen on the control panel.
It is recommended that periodic inspections be carried out using this hours meter as a reference.

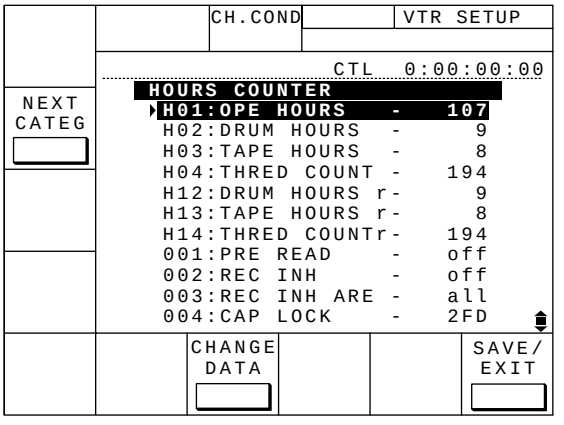
1. Method of Display

(1) Press the [SETUP] button at the side of the display.
(2) Press the [F6] (VTR SETUP) button.
(3) The hours meter will be displayed. (VTR SETUP screen)
To end the menu, press the [F10] (EXIT) button.

2. Contents of Display

Menu No.	Item	Contents	Display
H01	OPE HOURS	Accumlated power ON time	Total is displayed in one hour step
H02	DRUM HOURS	Accumlated drum rotating hours in the threading end state	Total is displayed in one hour step
H03	TAPE HOURS	Accumlated tape running hours during the F.FWD, REW, PLAY, SEARCH, REC, EDIT modes (excluding STILL mode)	Total is displayed in one hour step
H04	THREAD COUNT	Accumlated number of threading/unthreading cycle	Total number of actual number of cycle is displayed
H12	DRUM HOURS r	Accumlated drum rotating hours by threading after resetting	Total is displayed in one hour step
H13	TAPE HOURS r	Accumlated tape running hours during the F.FWD, REW, PLAY, SEARCH, REC, EDIT modes (excluding STILL mode) after resetting	Total is displayed in one hour step
H14	THREAD COUNT r	Accumlated number of threading/unthreading cycle after resetting	Total number of actual number of cycle is displayed

<Example of Display>



[Reference Information]

This unit can also display the hours meter at the maintenance screen other than at the SET-UP screen.

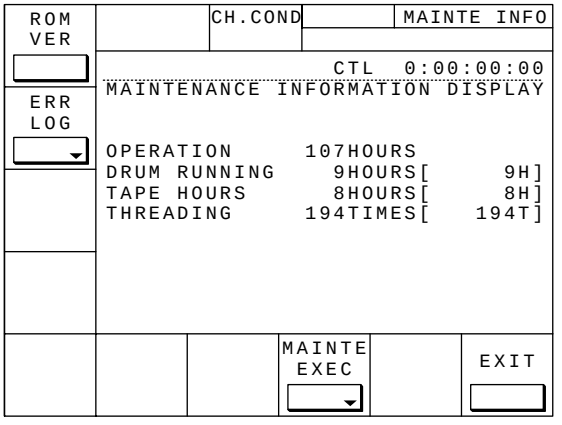
1. Method of Display

(1) At the HOME, TC, CUE, PF1, PF2, SETUP, and ALT screens, press the [SFT] button and MAINTENANCE switch simultaneously.
(2) The hours meter will be displayed at the first maintenance screen (MAINTE INFO).
To end the maintenance screen, press the [F10] (EXIT) button.

2. Contents of Display

Item	Contents (Refer to H01 to H04, H12 to H14 on the previous page for details)
OPERATION	Accumlated power ON time (Same as H01)
DRUM RUNNING	Accumlated drum rotation hours (Same as H02)/[ ] shows the accumlated drum rotation hours after reset (Same as H12)
TAPE HOURS	Accumlated tape running hours (Same as H03)/[ ] shows the accumlated tap running hours after reset (Same as H13)
THREADING	Accumlated number of treading cycle (Same as H04)/[ ] shows the accumlated number of threading cycle after reset (Same as H14)

<Example of Display>



5-2. Cleaning

To make the most of the functions, fully realize the performance of the unit, and lengthen the life of the unit and tape, clean daily.

5-2-1. Cleaning by Cleaning Cloth

1. Cautions
   - Be sure to turn the power off before cleaning.
   - Each block in the mechanical deck consists of precision parts and is adjusted precisely. Be careful not to damage each part and apply excessive force during cleaning.
   - Do not touch the greased portions during cleaning. If grease adheres to the cleaning cloth, replace the cleaning cloth with a new one.
     Using a cleaning cloth smeared with grease may cause grease to adhere where it should not.
   - After cleaning, insert a cassette tape after the cleaning fluid evaporates completely.

2. Preparations
   (1) Turn off the power.
   (2) Remove the upper lid. (Refer to section 2-5-1.)
   (3) Remove the plate MD assembly. (Refer to Section 2-6.)
   (4) Remove the cassette compartment. (Refer to section 2-7.)

5-2-2. Cleaning by Cleaning Cassette Tape

If the video heads are clogged, clean the video heads as the following procedure. Make sure to use the specified cleaning cassette tape. If other tape is used, unusual abrasion or damage of the video heads may occur.

Specified cleaning cassette tape：BCT-HD12CL

Procedure

1. Insert the Cleaning cassette tape BCT-HD12CL in the unit.
2. The cleaning cassette tape is played back automatically for approx. 3 seconds. After that, the cleaning cassette tape will be ejected automatically.
   Notes
   - If the cleaning cassette tape is not ejected after playing back more than 3 seconds, be sure to press the EJECT button immediately and eject the cleaning cassette tape.
   - Do not be place the cleaning cassette tape in the STOP mode, and do not put the unit in fast-forward and rewind mode, because the video heads may be damaged.
3. Confirm that the head clogging is clear.

If the video heads are clogged after cleaning by cleaning cassette tape, clean them by cleaning cloth. (Refer to Section 5-2-3.)

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5-2-3. Cleaning the Rotary Heads

WARNING

Never touch the rotating drum.
When the drum which is rotating at high speed is touched using your hand or a tool, your hand or the tool will be pushed with very strong force, resulting in injuries.
Begin cleaning after turning off the power and when the drum has stopped rotating.

Note

The rotary heads damages easily. When cleaning, be very careful not to damage it.

Tools

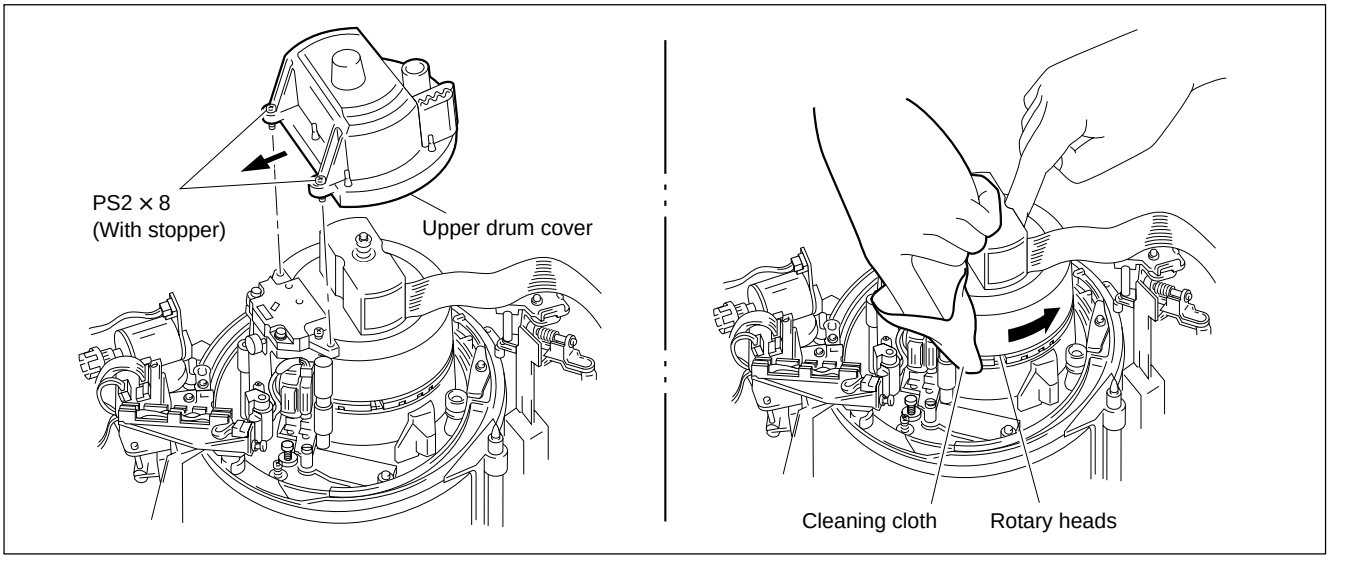
- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

Note

Never use cotton swab to clean.

Procedure

1. Loosen the two screws and remove the upper drum cover.
   Reference Information
   The screws are not removed as they are secured by stoppers.
2. Hold the cleaning cloth moistened with cleaning fluid making sure that it does not become wrinkled, and press the cleaning cloth slightly against the rotary heads.
3. Hold the cloth steadily, and move the inner drum slowly in the counterclockwise direction for 2 to 3 turns by hand.
   Note
   Be sure to rotate the inner drum in the counterclockwise direction. Be sure to clean along the circumference.
   Rotating the inner drum in the reverse direction (clockwise direction), or cleaning in the vertical direction may damage the rotary heads and scratch the brush/spring.
4. After cleaning, be sure to wipe with as dry cleaning cloth 2 or 3 times.
5. While pressing the upper drum cover in the direction shown in the figure, tighten the two screws.
   Tightening torque: 14.7×10^{-2} N • m (1.5 kgf • cm)



Cleaning the Rotary Head

5-2-4. Cleaning the Tape Running Surface of Upper Drum

Note

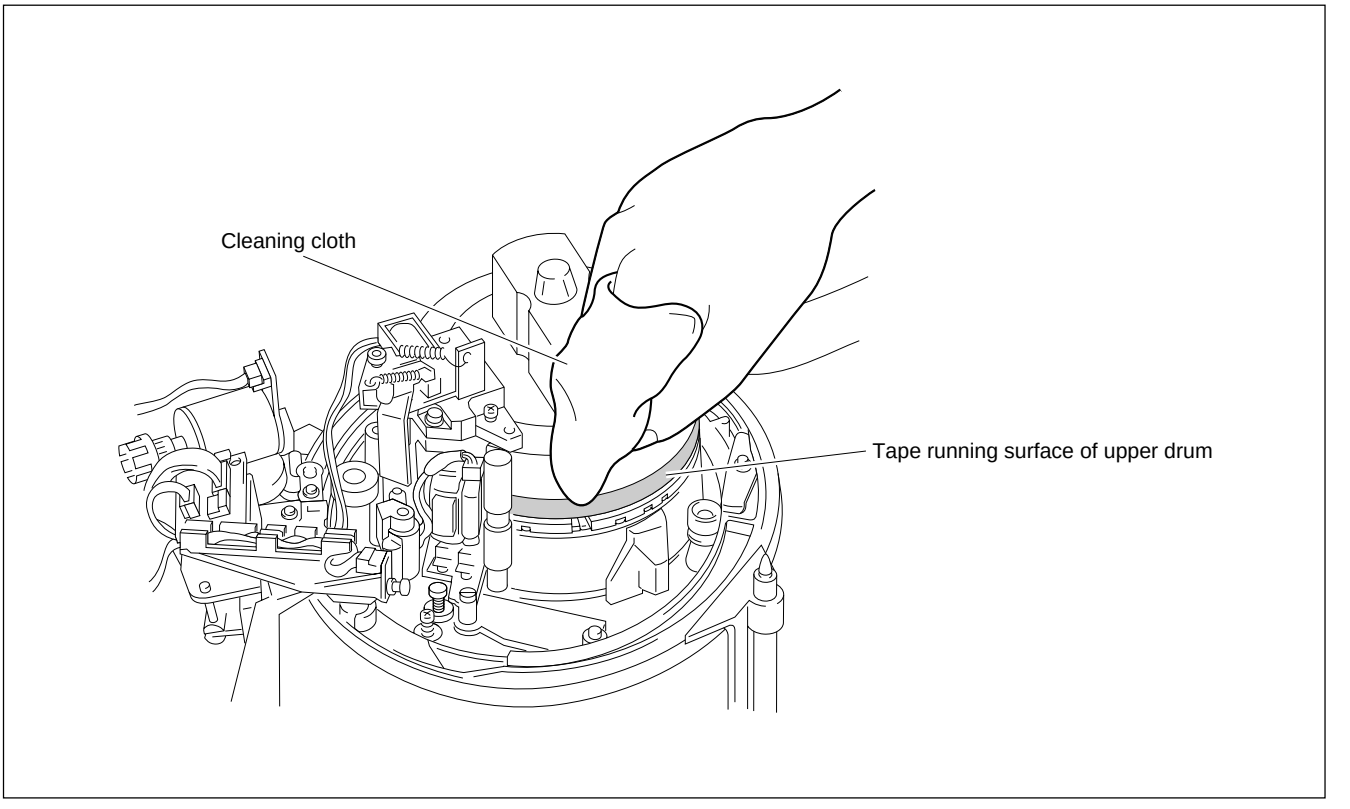
When cleaning, be careful not to scratch the upper drum.
Be especially careful when cleaning the bottom edges of the upper drum because they are near the rotary heads.

Tools

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

Procedure

1. Press the cleaning cloth moistened with cleaning fluid slightly against the tape running surface of the upper drum (shaded portion in the figure).
2. Clean along the circumference 2 or 3 times.
   Note
   Be especially careful when cleaning the below edges of the upper drum.
3. After cleaning, be sure to wipe with a dry cleaning cloth 2 or 3 times.



Cleaning the Tape Running Surface of Upper Drum

5-2-5. Cleaning the Tape Running Surface of Lower Drum and Lead Surface

Note

When cleaning, be careful not to scratch the lower drum (especially the lead surface).

Be especially careful when cleaning the upper edges of the lower drum because they are near the rotary heads.

Tools

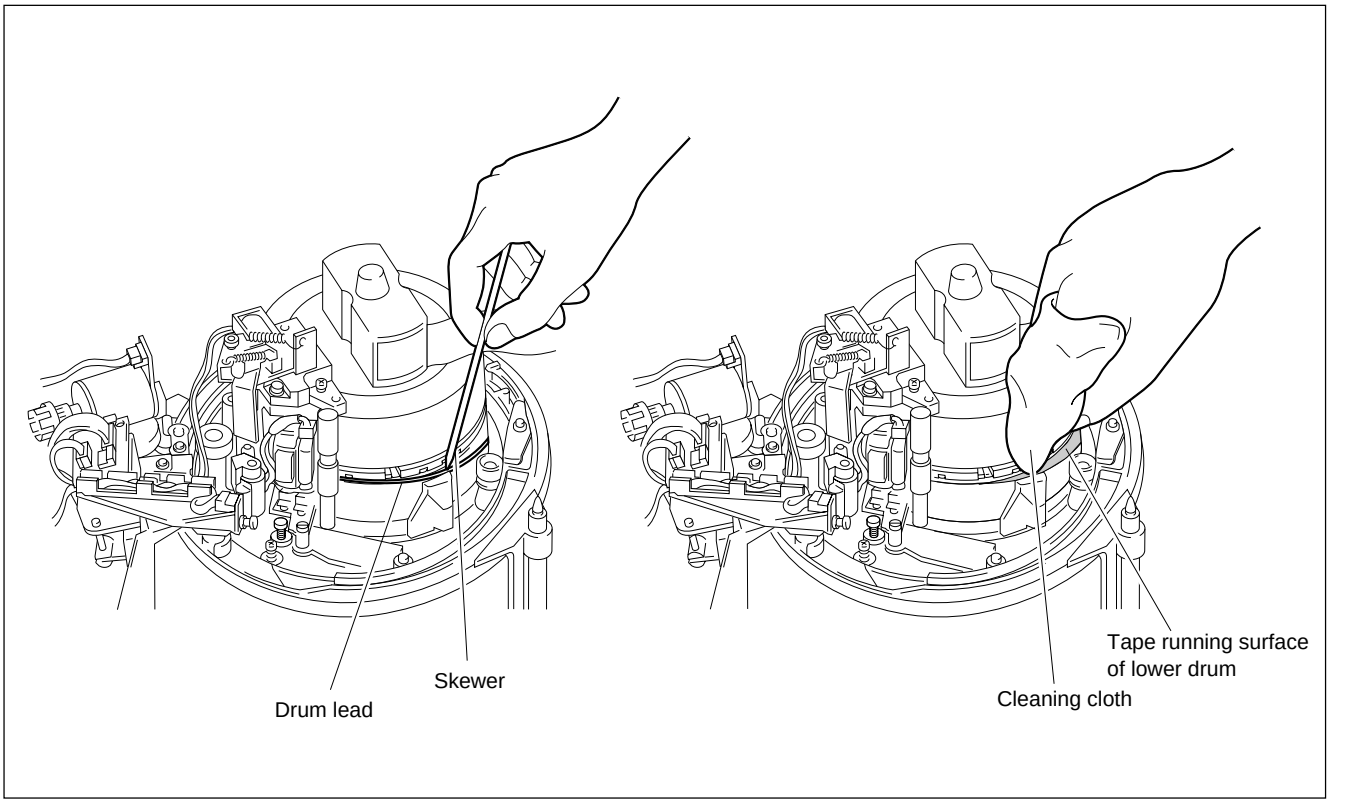
- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01
- Skewer or equivalent (Never use a metallic one)

Procedure

1. As shown in the figure, place the skewer (or equivalent) along the drum lead surface and remove the magnetic powder.

   Note

   - Never use a metallic skewer as this may damage the tape running surface.
   - Magnetic powder on the drum lead surface may have adverse effects on tracking. Therefore remove the magnetic powder completely during cleaning.
2. Clean the tape running surfaces and lead surface (shaded portion in the figure) of the lower drums using the cleaning cloth moistened with cleaning fluid.
3. After cleaning, be sure to wipe with a dry cleaning cloth 2 or 3 times.



Cleaning the Tape Running Surface of Lower Drum and Lead Surface

5-2-6. Cleaning the Stationary Heads

Note

When cleaning, be careful not to scratch the surface of the heads.

Tools

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

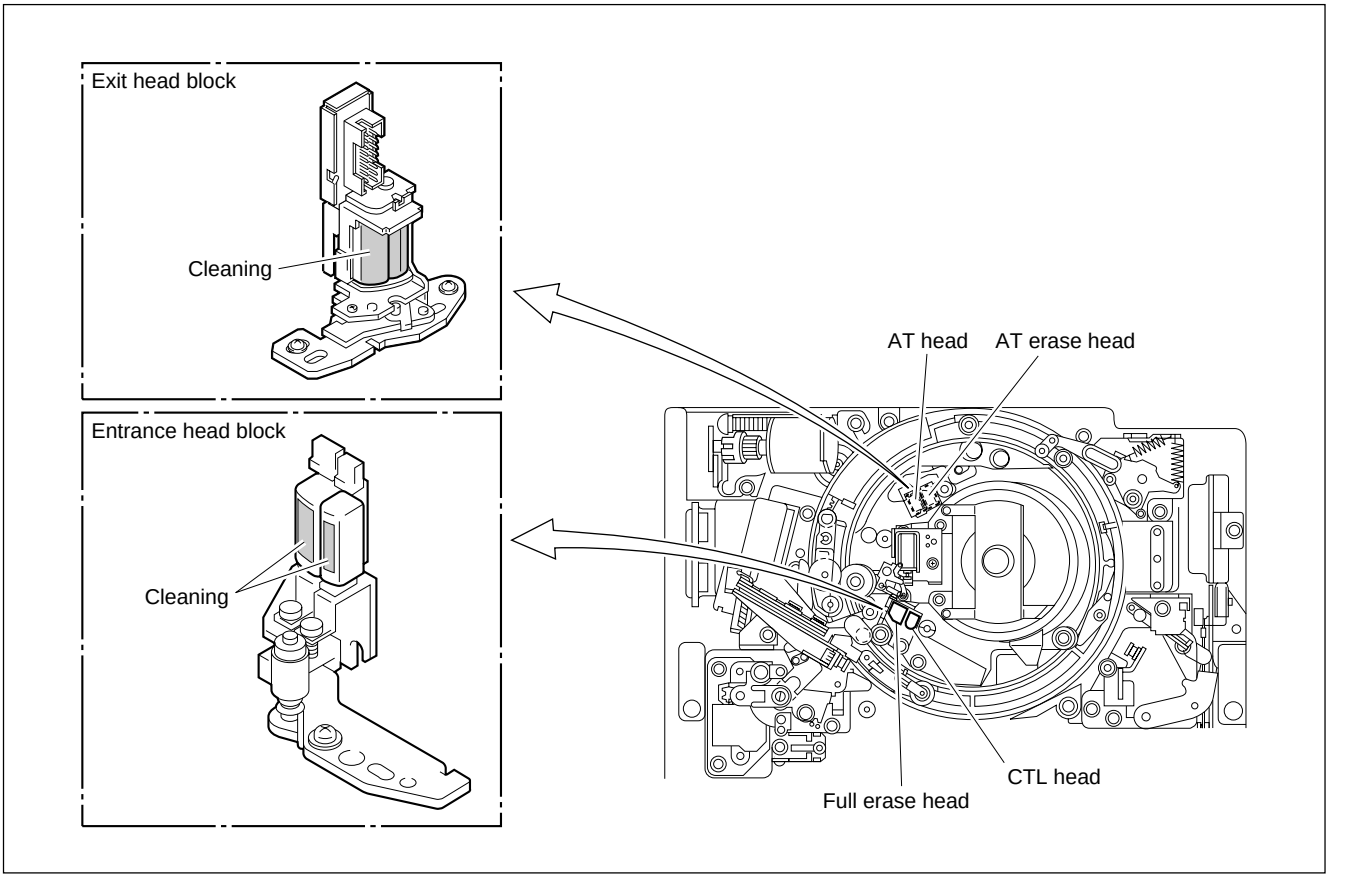
Procedure

1. Clean the tape running surface of the AT head, AT erase head, CTL head, and full erase head in the vertical direction with a cleaning cloth moistened with cleaning fluid.

   Note

   Errors may occur in recording or playback if there is magnetic powder on the head gap portion of the AT head, AT erase head, CTL head, and full erase head.
   Therefore remove the magnetic powder completely during cleaning.

2. After cleaning, be sure to wipe with a dry cleaning cloth 2 or 3 times.



Cleaning the Stationary Head

5-2-7. Cleaning the Tape Running System and Tape Cleaner

CAUTION

Do not touch the edges of the tape cleaner with your bare hands as they are very sharp. Also be careful when cleaning.

Tools

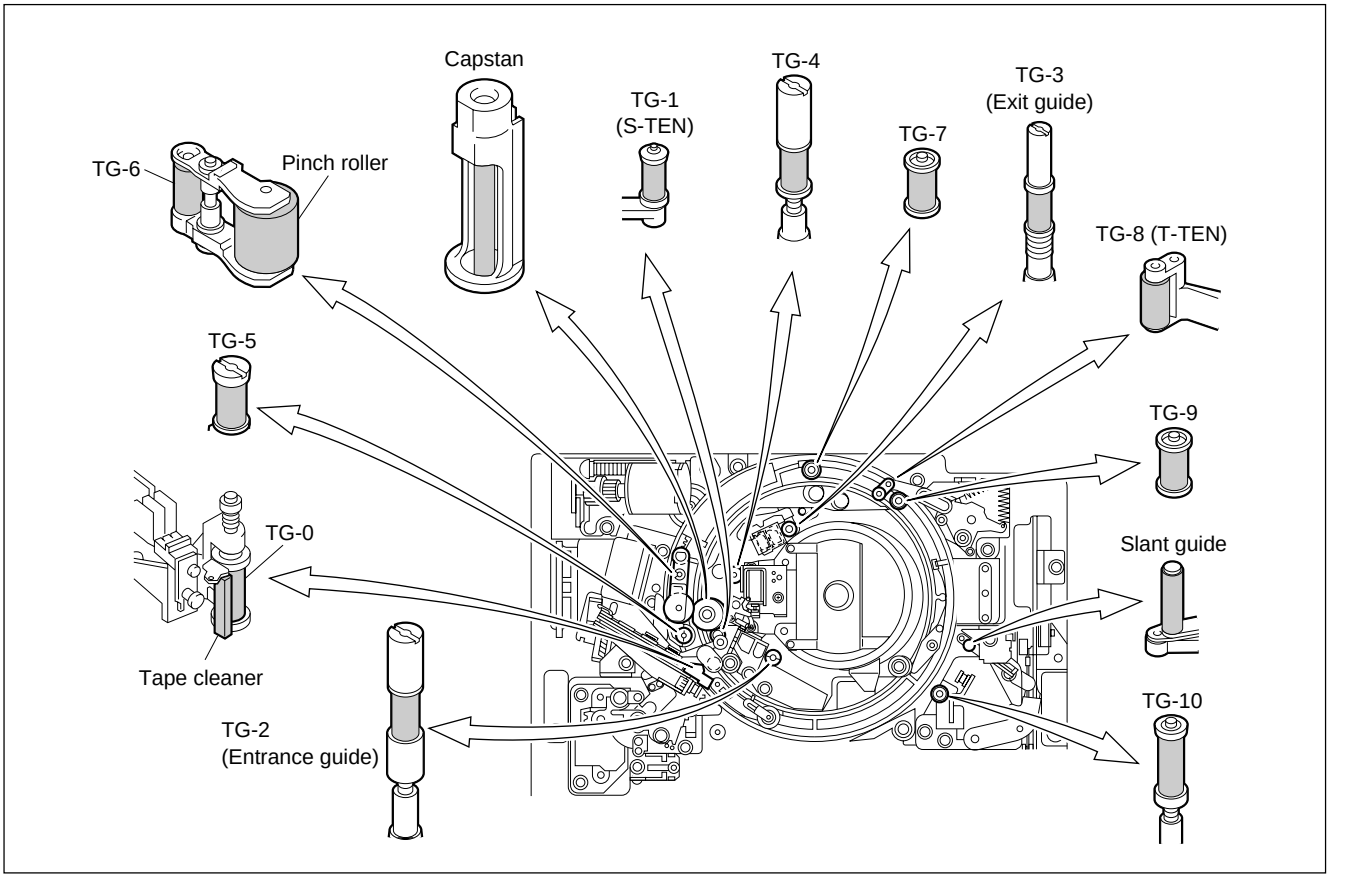
- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01

Procedure

1. Wipe the surfaces of the tape cleaner using a paper (which is similar to the paper of this manual) up and down to drop off magnetic powder on the tape cleaner.

   Notes

   - Do not touch the edges of the tape cleaner with your bare hands.
   - Do not scratch the tape cleaner nor apply excessive force.
2. Clean each guide and tape running surfaces (shaded portions in the figure) of the tape cleaner with a cleaning cloth moistened with cleaning fluid.
3. After cleaning, be sure to wipe with a dry cleaning cloth 2 or 3 times.



Cleaning the Tape Running System and Tape Cleaner

5-2-8. Cleaning the Cassette Compartment and Cassette Supports

Notes

- When cleaning, do not apply excessive force to the compartment and mirror.
- Never use chemicals such as alcohol to clean the cassette doors and mirror. Use of chemicals may cause cracks.

Tools

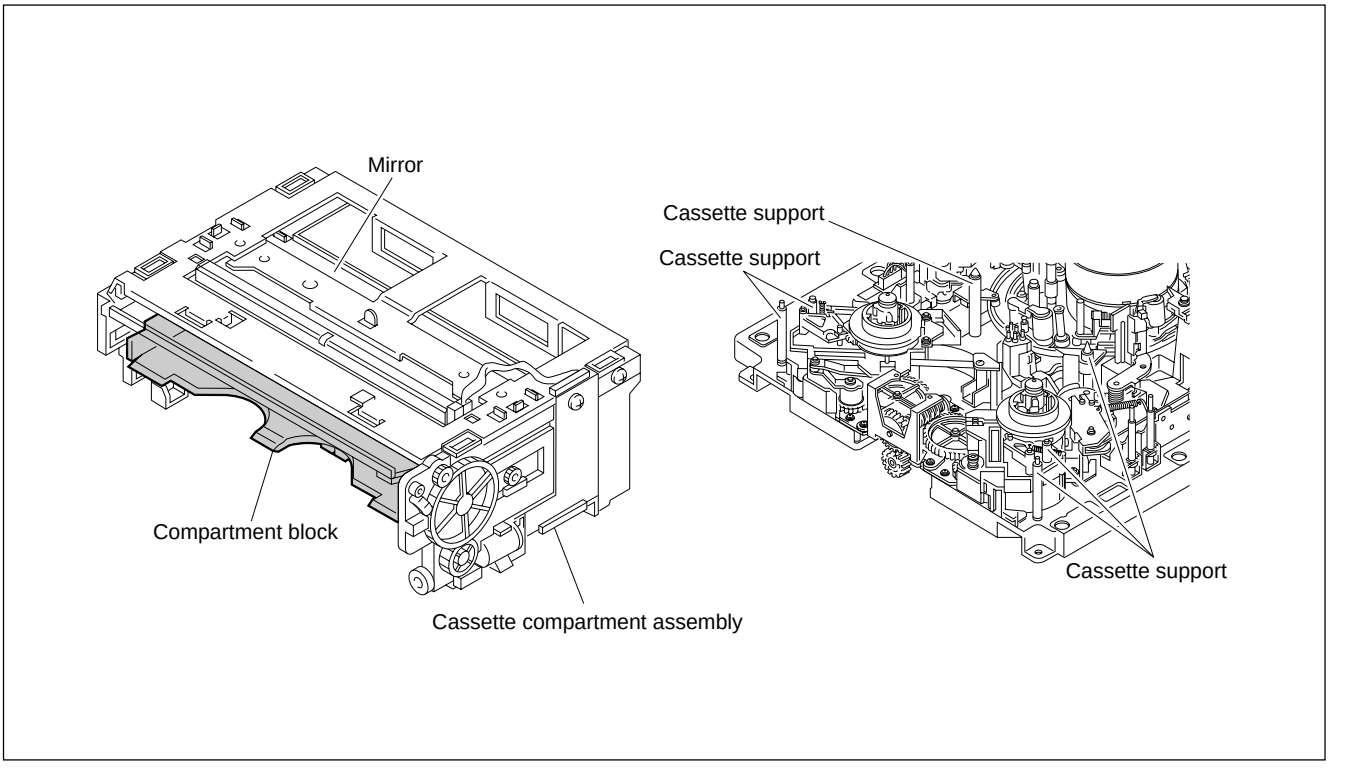
- Cloth (or gauze)
- Vacuum cleaner

Procedure

1. Remove the cassette compartment from the unit. (Refer to 2-7.)
2. Suck away the dusts in the cassette compartment with the vacuum cleaner from the cassette insertion inlet.
3. Clean the compartment (shaded portion in the figure) with a dry cloth (or gauze).

   Note

   Do not apply excessive force to the compartment.
4. Clean the cassette supports on the mechanical deck with a dry cloth (or gauze).



Cleaning the Cassette Compartment and Cassette Supports

5-2-9. Cleaning the Fan Motors

Note

The temperature in the unit increases when dusts attach to the fan motors and disturb the flow of air, and have adverse effects on the performance and life of the unit. Clean the fan motors on the rear panel periodically because it accumulates dusts easily.

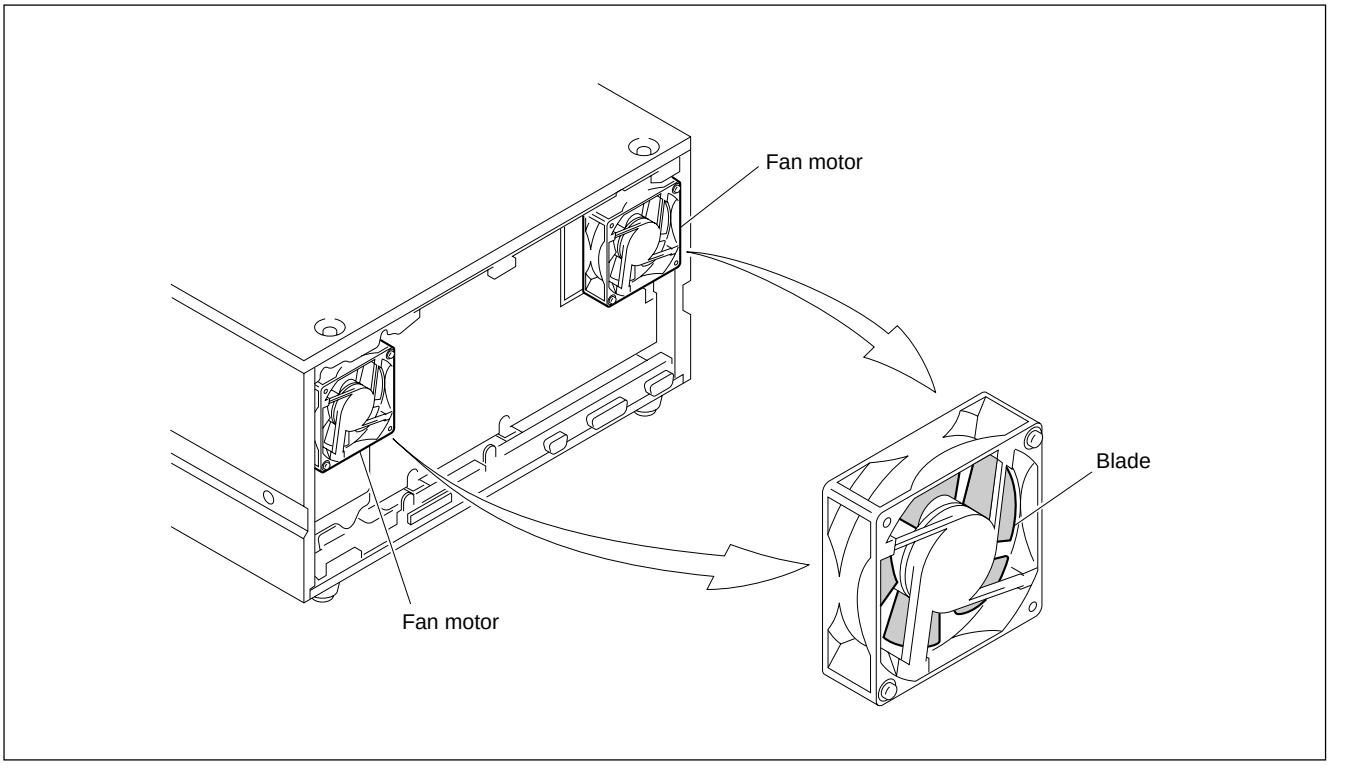
Tools

- Cleaning cloth: 3-184-527-01
- Cleaning fluid: 9-919-573-01
- Vacuum cleaner

Rear fan motor

Procedure

1. Remove the power panel. (Refer to Section 2-5-4.)
   However do not disconnect the harness, etc.
2. Remove the connector panel. (Refer to Section 2-5-3.)
   However do not disconnect the harness, etc.
3. Suck off the dusts on the fan motors using the vacuum cleaner.
4. Clean the blades (shaded portion in the figure) of the fan motor with the cleaning cloth moistened with cleaning fluid.
5. Install the connector panel. (Refer to Section 2-5-3.)
6. Install the power panel. (Refer to Section 2-5-4.)

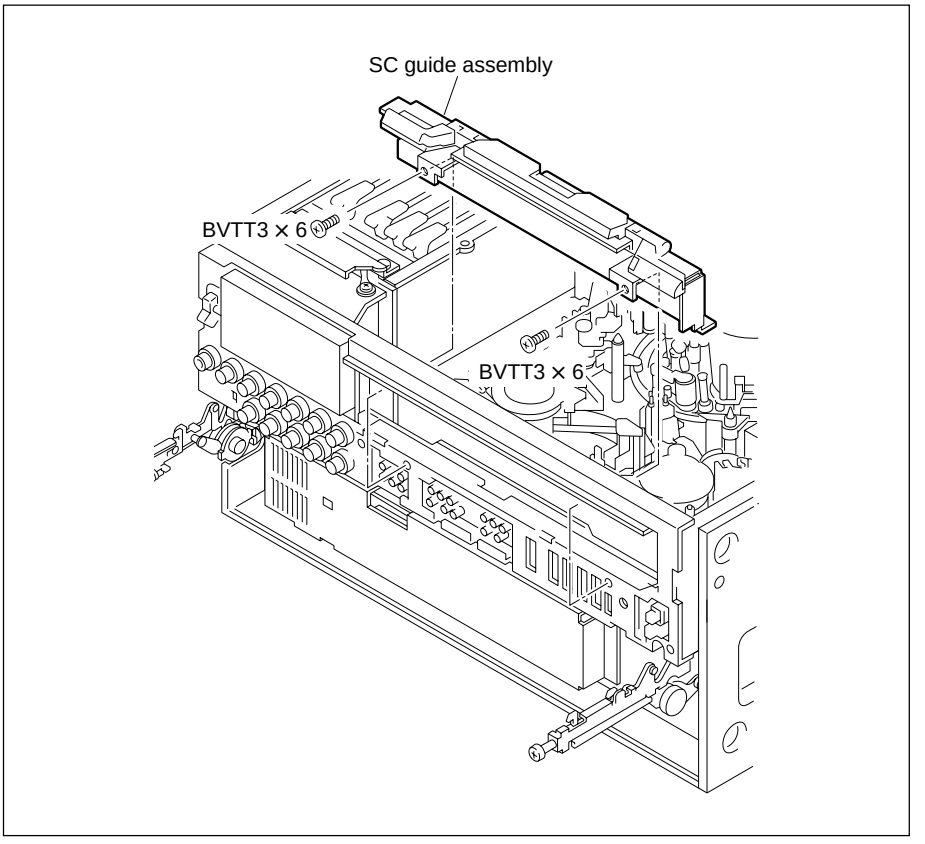


Cleaning the Fan Motor

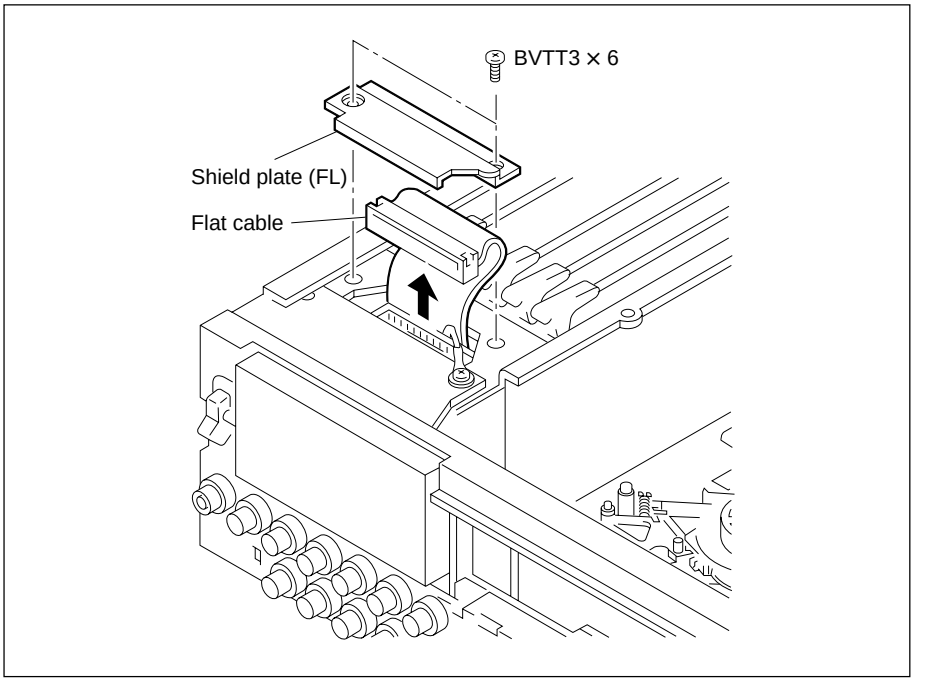
Front fan motor

Procedure

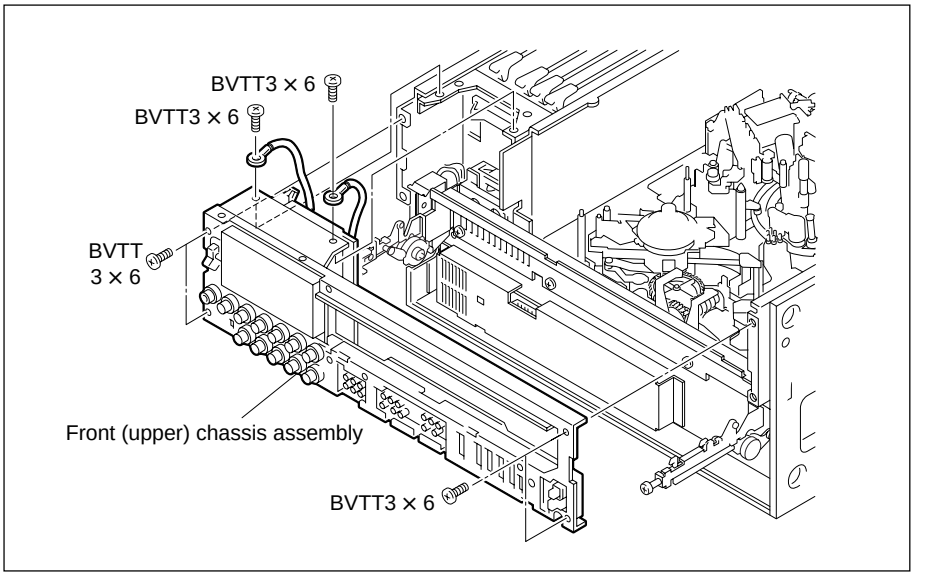
1. Remove the control panel assembly. (Refer to “Section 2-4. Removing/Installing the Lower Control Panel”.)
2. Remove the upper control panel. (Refer to “Section 2-5-2. Removing/Installing the Upper/Lower Control Panel”.)
3. Remove the cassette compartment. (Refer to “2-7. Removing/Installing the Cassette Compartment”.)
4. Remove the two screws and remove the SC guide assembly.



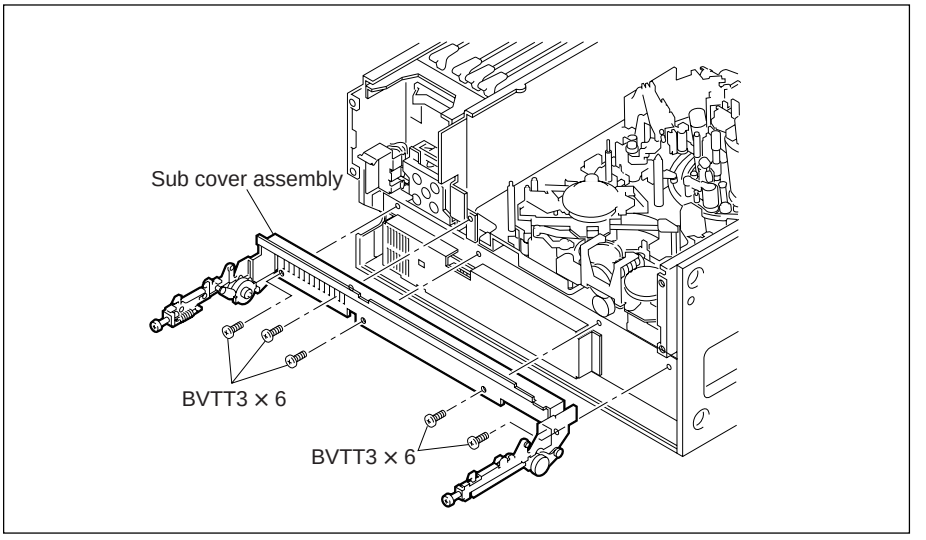
5. Remove the two screws and remove the shield plate (FL).
6. Disconnect the flat cable from the FP-103 board.



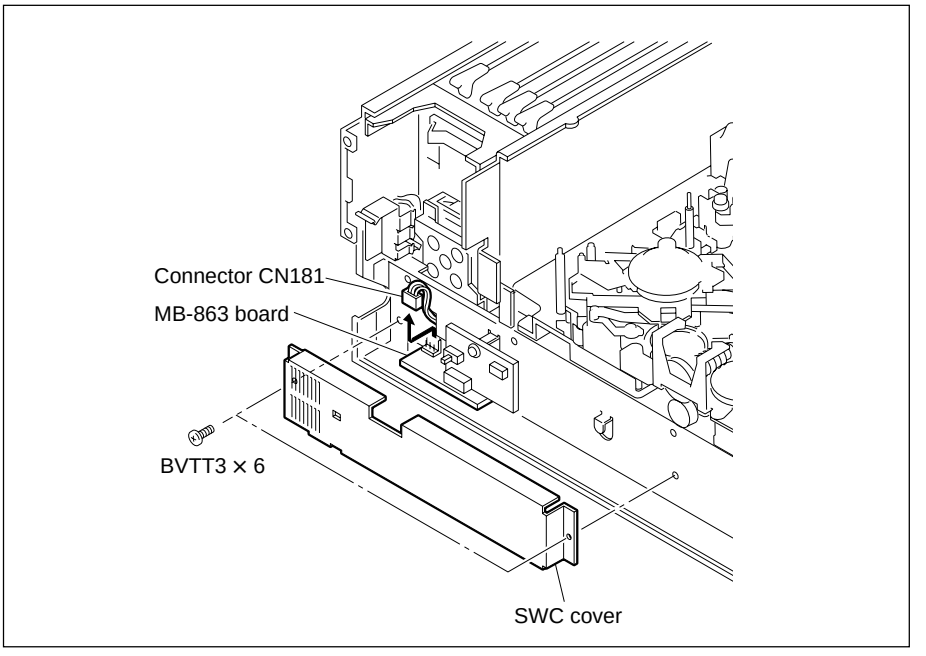
7. Remove the six screws and remove the front upper chassis assembly.



8. Remove the five screws and remove the SUB cover assembly.



9. Remove the two screws and remove the SWC cover.
10. Disconnect the CN181 connector from the MB-863 board.



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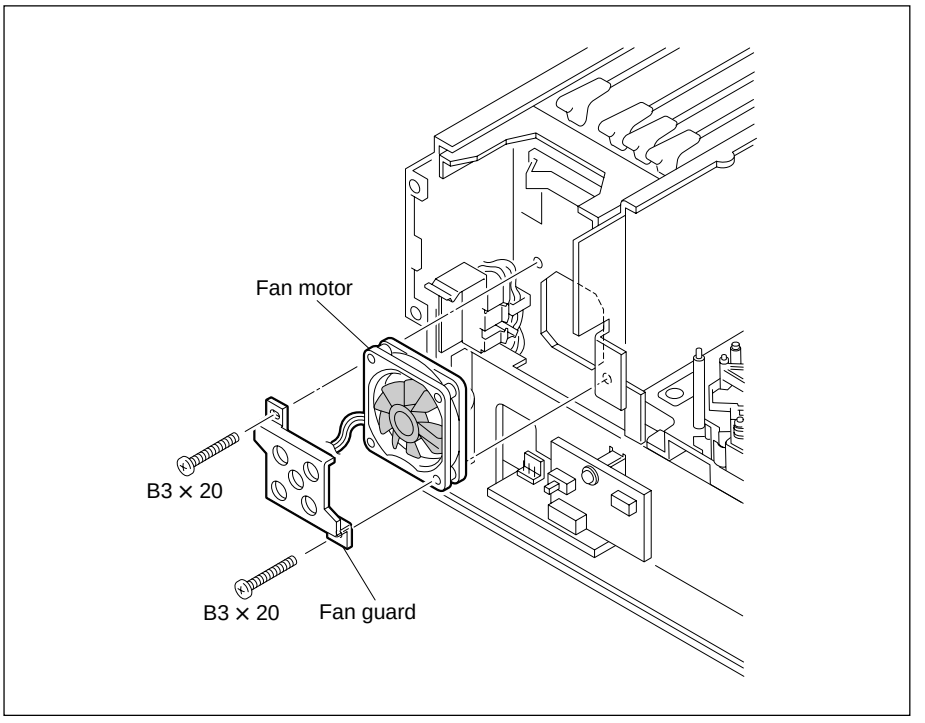
11. Remove the two screws and remove the fan guard and fan motor.
12. Clean the blades (shaded portion in the figure) of the fan motor with the cleaning cloth moistened with cleaning fluid.

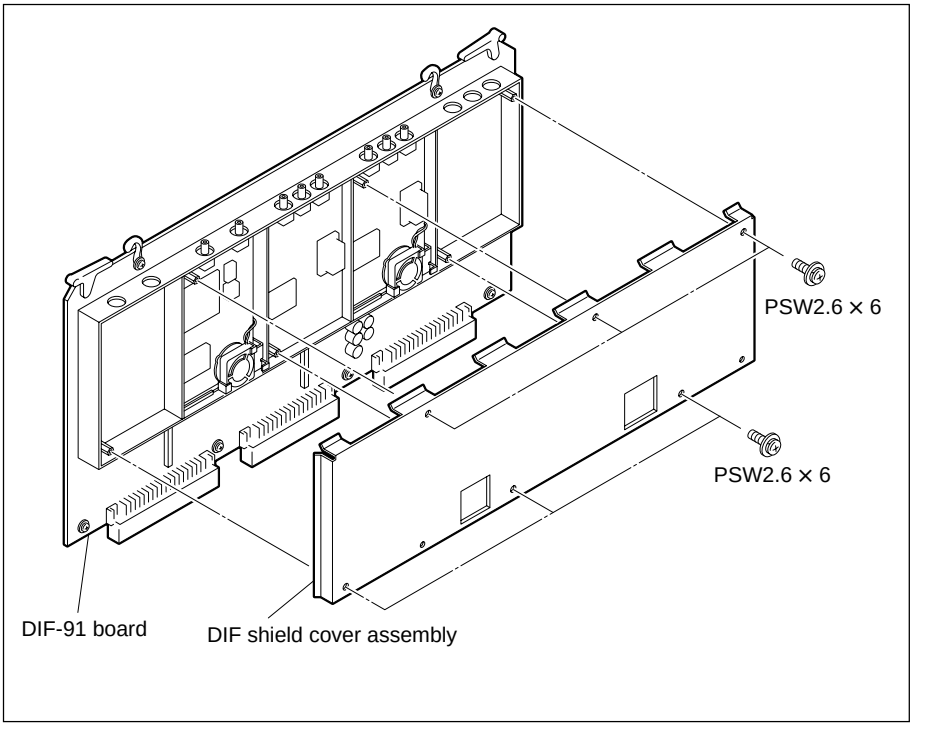


13. Install the parts removed in the reverse order of this procedure.

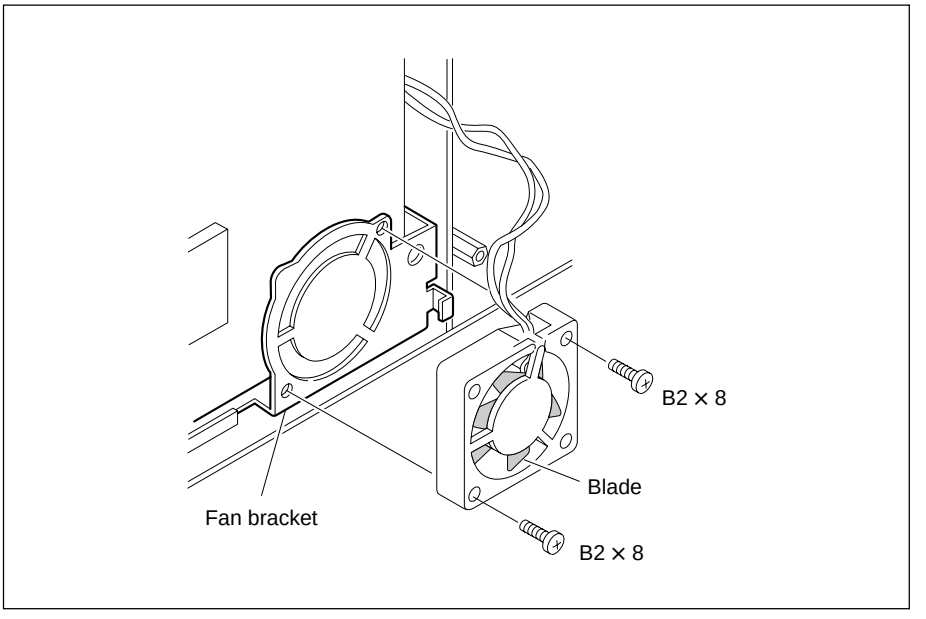
Fan Motor of DIF-91 Board

Procedure

1. Remove the DIF-91 board from the unit. (Refer to “2-10-1. Removing/Installing the Plug-In Board”.)
2. Remove the six screws and remove the DIF shield cover.



3. Remove the two screws and remove the fan motor.
4. Clean the blades (shaded portion in the figure) of the fan motor with the cleaning cloth moistened with cleaning fluid.
5. Install the parts removed in the reverse order of this procedure.



Section 6
Spare Parts

When replacing the mounted circuit boards, main parts, etc., obtain the parts referring to the part names and part numbers listed in the following.

Unit (Boards and Main Parts)

Part Name	Part No.
Mounted circuit board, AC-204	A-8320-162-A (∗2)
Mounted circuit board, APR-49	A-8323-540-A (∗2)
Mounted circuit board, CL-29	A-8276-626-B (∗2)
Mounted circuit board, CP-266A	A-8312-826-A (∗2)
Mounted circuit board, CP-348	A-8323-542-A (∗2)
Mounted circuit board, CP-349	A-8323-544-A (∗2)
Mounted circuit board, CUE-10	A-8312-991-A (∗2)
Mounted circuit board, DIF-91A	A-8324-381-A (∗2)
Mounted circuit board, DPR-143	A-8323-550-A (∗2)
Mounted circuit board, DR-307	A-8313-031-A (∗2)
Mounted circuit board, DT-34C	A-8312-855-A (∗2)
Mounted circuit board, EQ-85	A-8323-552-A (∗2)
Mounted circuit board, FP-103	A-8313-434-A (∗2)
Mounted circuit board, HN-264	A-8323-553-A (∗2)
Mounted circuit board, HN-265	A-8323-555-A (∗2)
Mounted circuit board, HN-266	A-8323-557-A (∗2)
Mounted circuit board, KY-330A	A-8312-824-A (∗2)
Mounted circuit board, LP-81	A-8276-627-A (∗2)
MB assembly (Mounted circuit board, MB-863)	A-8323-791-A (∗2)
Mounted circuit board, PC-70	A-8276-625-A (∗2)
Mounted circuit board, PSW-51	A-8312-989-A (∗2)
Mounted circuit board, PTC-69	A-8276-585-B (∗2)
Mounted circuit board, PTC-71	A-8276-619-A (∗2)
Mounted circuit board, SS-88	A-8323-564-A (∗2)
Mounted circuit board, SW-749	A-8269-119-A (∗2)
Mounted circuit board, SWC-17E	A-8323-764-A (∗2)
Mounted circuit board, SWC-37	A-8320-057-A (∗2)
Mounted circuit board, TR-79	A-8276-628-A (∗2)
Mounted circuit board, VR-152	A-8275-078-A (∗2)
Mounted circuit board, VR-153	A-8275-075-A (∗2)
Printed circuit board, CCM-15	1-648-570-11 (∗2)
Printed circuit board, PD-35	1-622-596-11 (∗2)
Printed circuit board, PTC-54	1-640-163-12 (∗2)
AD key panel assembly (Lower control panel)	A-8313-299-A (∗1)
Front panel assembly (Upper control panel)	A-8279-222-B (∗1)
Upper lid assembly	A-8278-583-C (∗1)
Bottom plate assembly	X-3679-542-1 (∗1)
Side panel (Right)	3-171-533-04 (∗1)
Side panel (Left)	3-171-534-04 (∗1)
Switching regulator	1-413-831-24

(∗1): Refer to sections 2-5-1 and 2-5-2.
(∗2): Refer to section 2-9-1.

Unit (Accessories)

Part Name	Part No.	
Power supply cord	1-551-812-11	
Memory card (SRAM 64K)	1-759-164-11	
Plug holder (B)	2-990-242-01	
Spacer (A)	3-181-535-01	
Spacer (B)	3-181-536-01	
Protection sheet (Standard)	3-704-356-01	
Screw PSW 4 × 16	7-682-965-01	

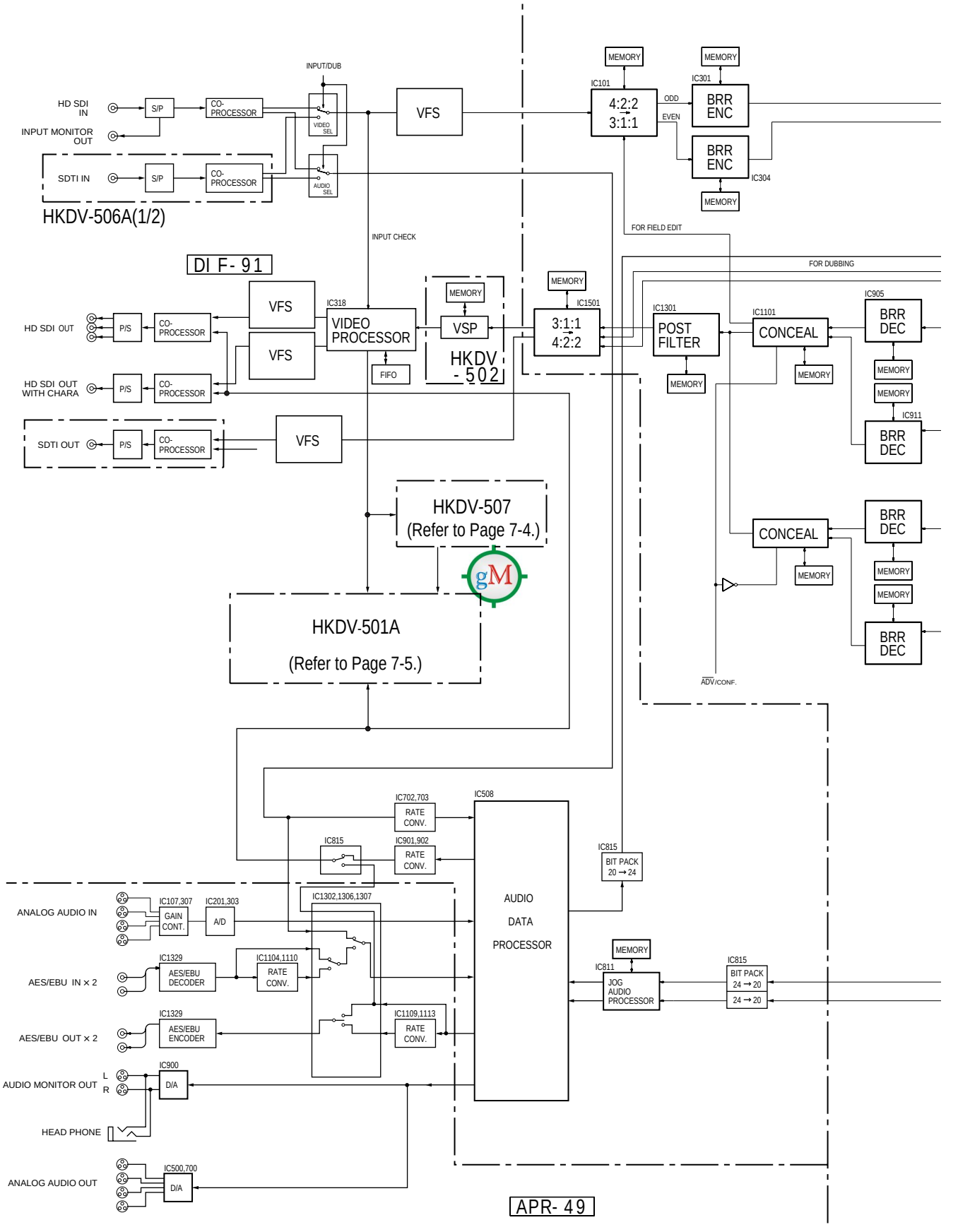
Options

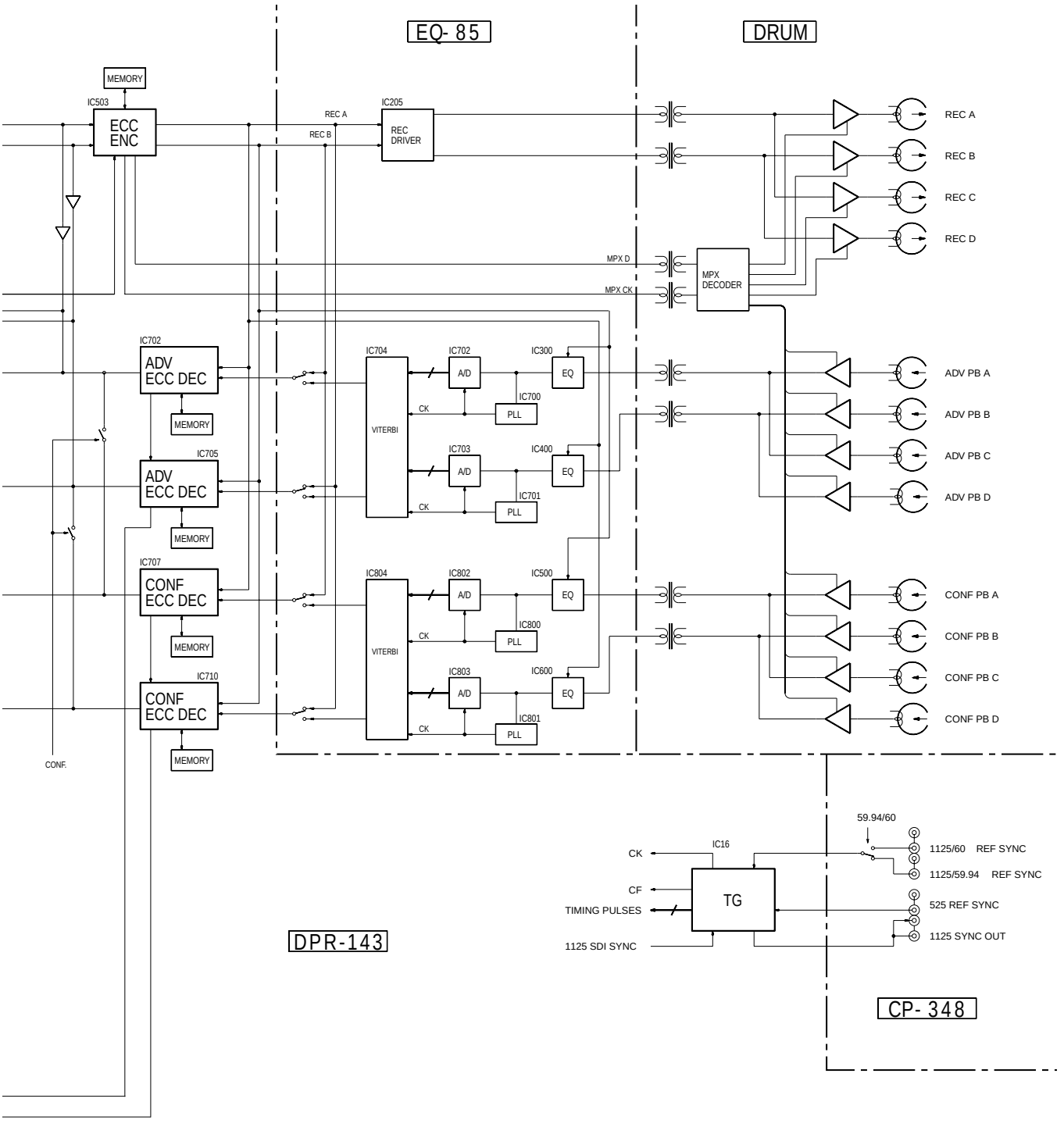
Part Name	Part No.	
Mounted circuit board, DPR-105	HKDV-502	
Mounted circuit boards, PD-94 and TX-68	HKDV-507	
Mounted circuit board, RX-46	HK-202	(∗2)
Mounted circuit board, TX-68	HK-201	(∗2)

∗2): Refer to section 2-9-1.

Section 7
Overall Block Diagram

7-1. Signal Processing System

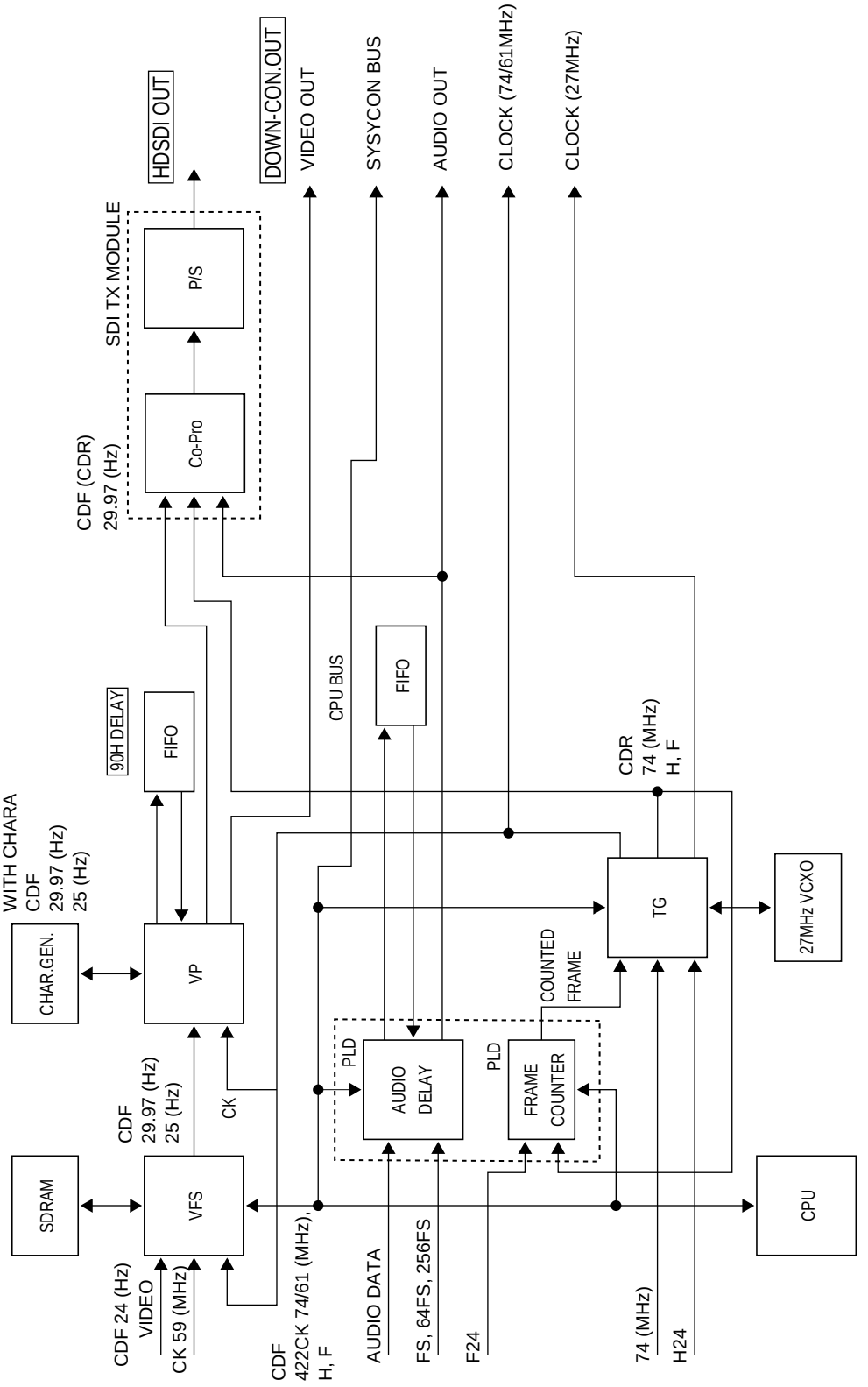




Signal Processing System

Overall

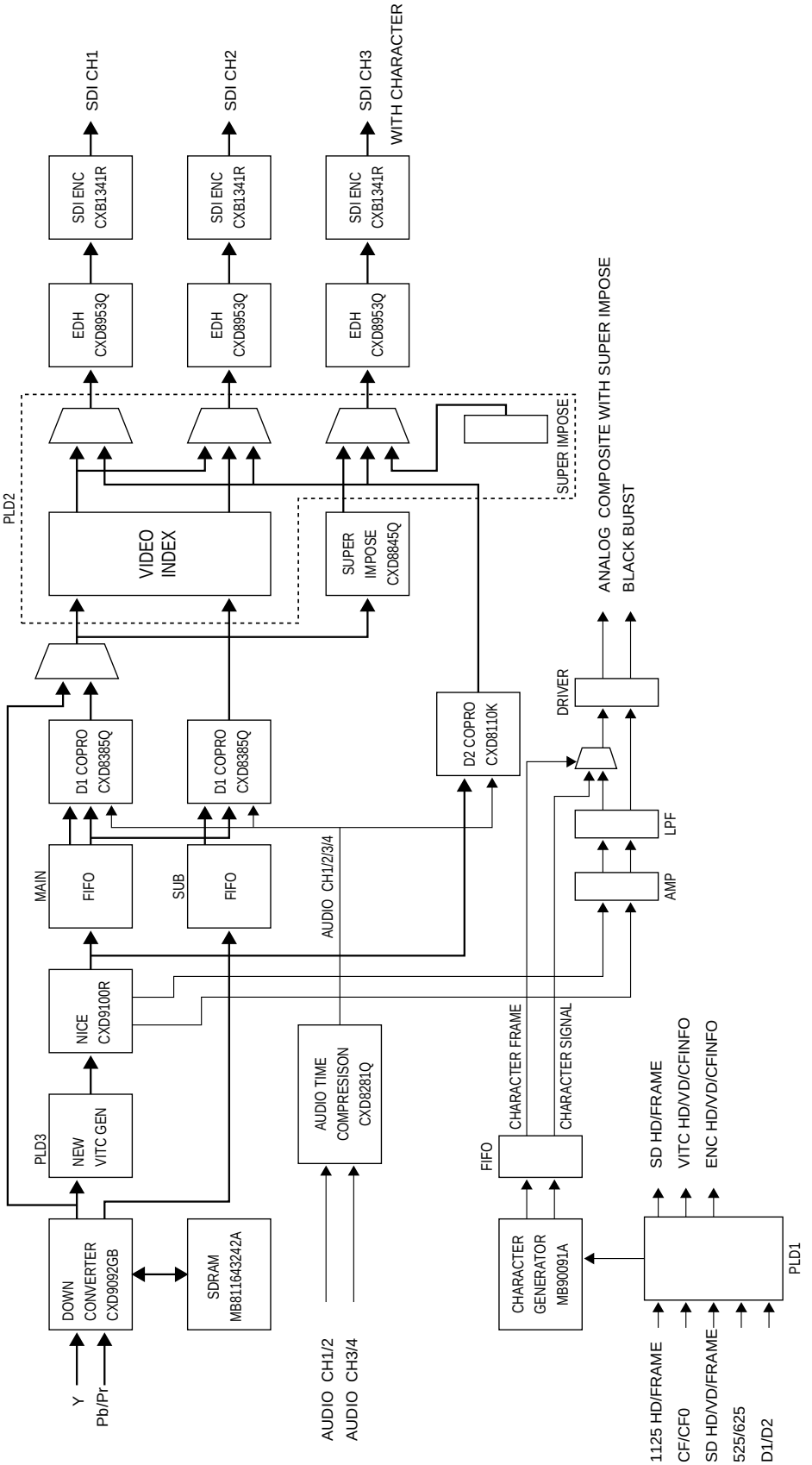
Overall Block Diagram



Signal Processing System

Overall

(HKDV-507)

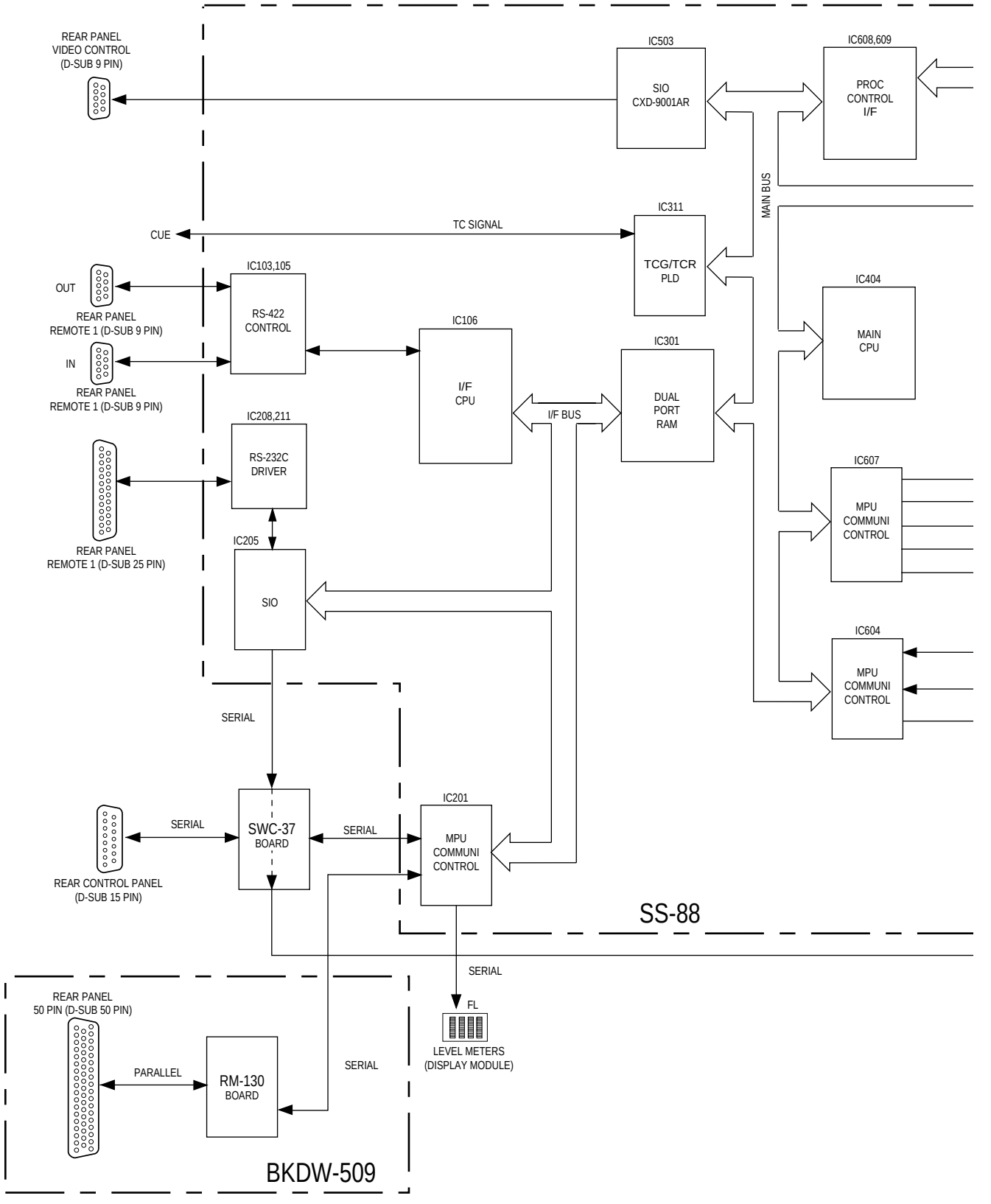


Signal Processing System

Overall

(HKDV-501A)

7-2. Control System



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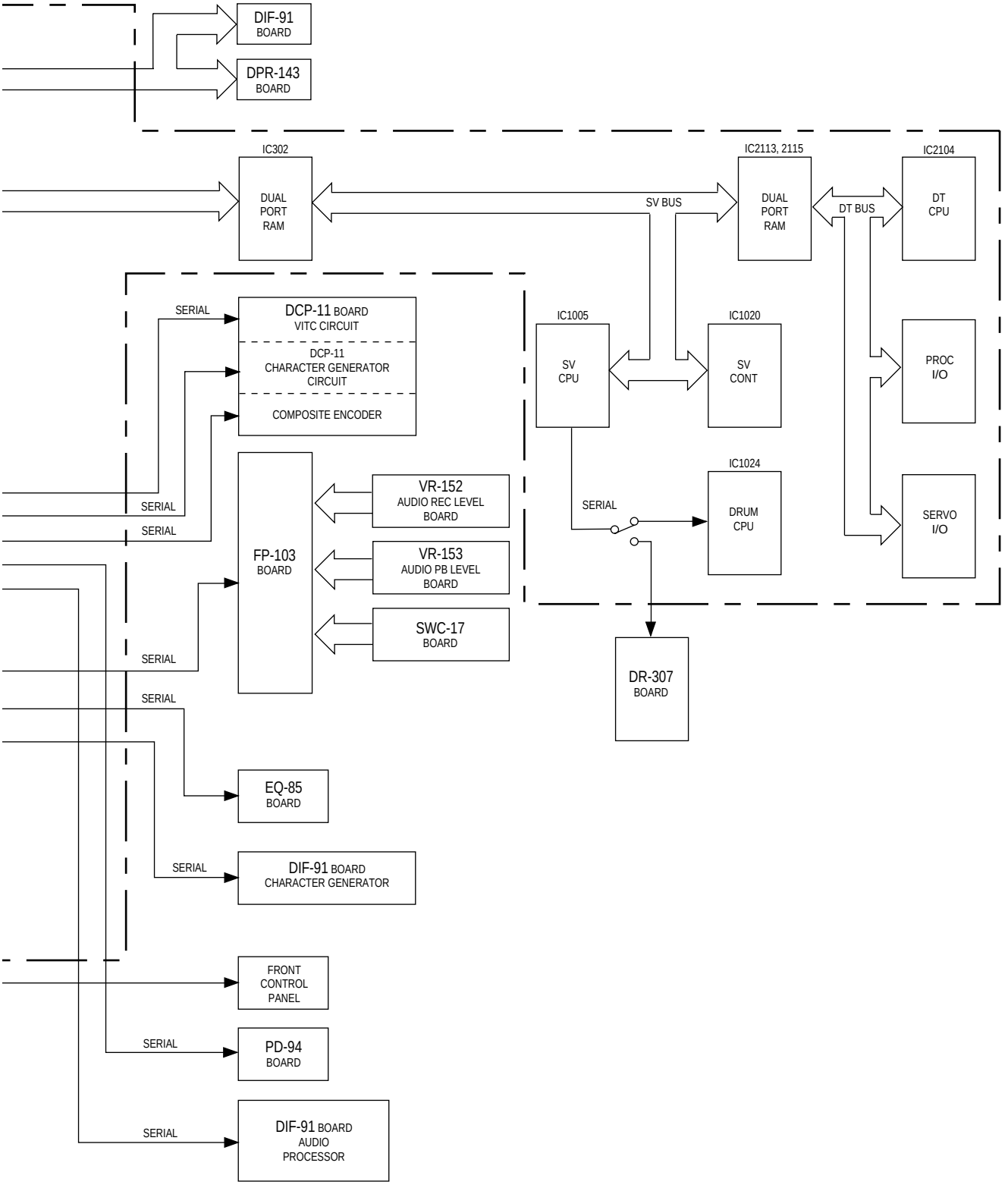

Control System
Overall

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SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety checks before releasing the set to the customer :

Check the metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 3.5 mA. Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 5.25 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 20 V AC range are suitable. (See Fig. A)

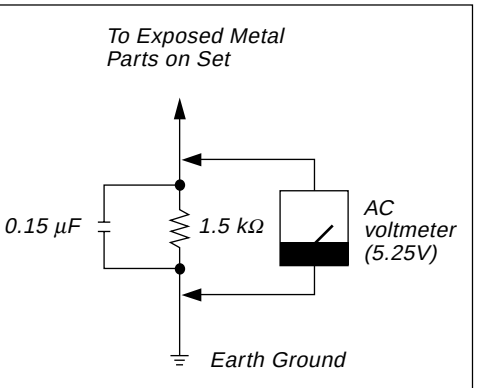

Fig A. Using an AC voltmeter to check AC leakage.

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